Coal Age

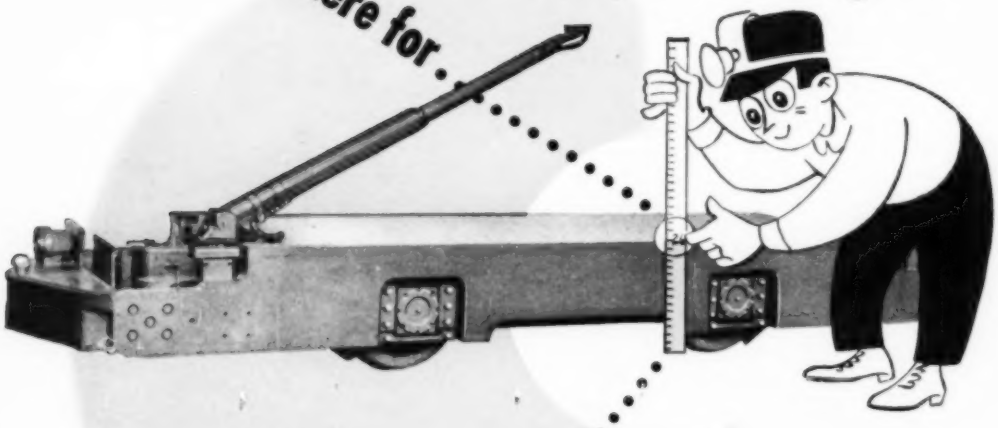
A McGRAW-HILL PUBLICATION

MARCH, 1949

WELFARE ABROAD... p. 74

Look here for . . . .

YOU CAN BE SURE . . IF IT'S Westinghouse



HIGH PRODUCTION

OF LOW COAL!

The 15-Ton Low Liner . . *26 inches low*

. . . a *standard* Westinghouse mine locomotive designed and built to meet the *special* requirements for mining low seam coal.

The low height and excellent clearance allows this versatile locomotive to operate in seams of thickness formerly limited to gathering locomotives. It's your answer to the increasing demand for getting out every possible ton of coal . . . efficiently and economically.

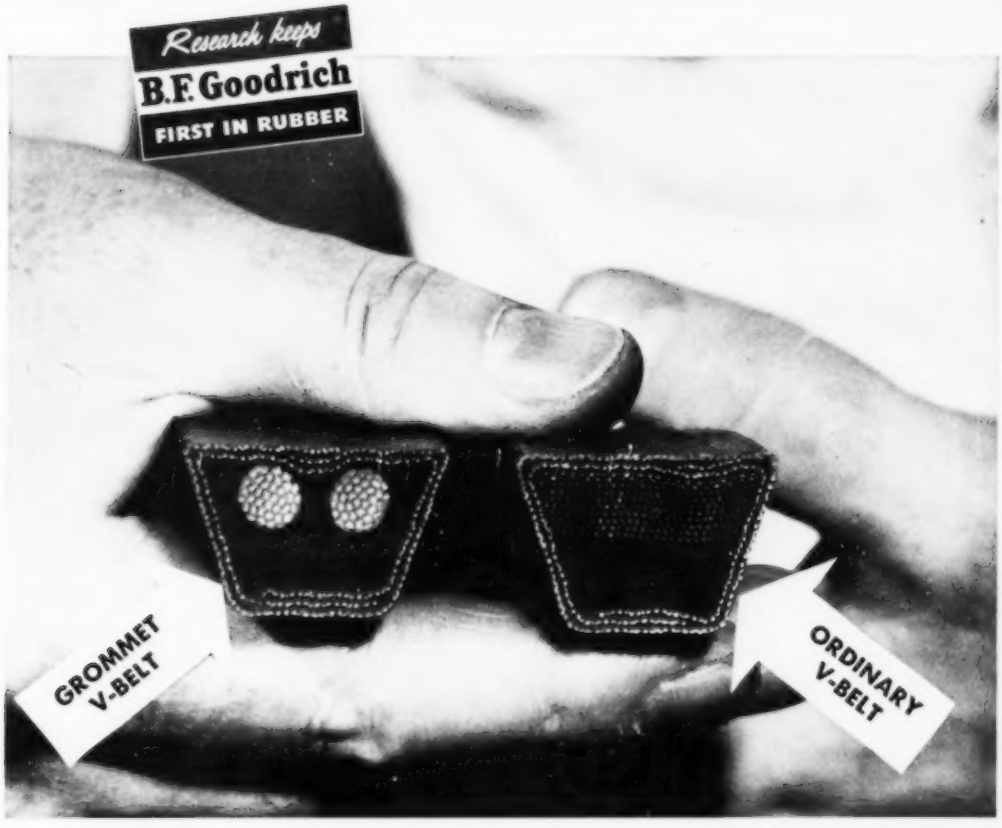
Although *The Low Liner* can be built 26 inches low, all important standard details of design and construction have been maintained: flush-frame construction for safety and ample equipment space; roller journal bearings with boxes removable without untrucking; leaf springs for smoother riding; cross equalization for better tracking; electro-pneumatic control for positive operation.

Consult your Westinghouse office or write for B-3702, "The Low Liner", Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pennsylvania. J-15129

Westinghouse

PLANTS IN 25 CITIES . . . OFFICES EVERYWHERE

Mine Locomotives



Cut V-belt costs 20 to 50% with new B. F. Goodrich grommet V-belt

Lasts longer, stands shock loads better, costs no more

A NEW patented construction by B.F.Goodrich puts all the cord material in a V-belt to work in the form of twin, endless, extra-flexible grommets — *not* cables — placed close to the driving faces of the belt (see left, above). No "lazy" cords in the interior to shirk their share of the load. Because grommets are endless they are more flexible, with no stiff section such as occurs in an ordinary cable, with spliced or overlapped ends.

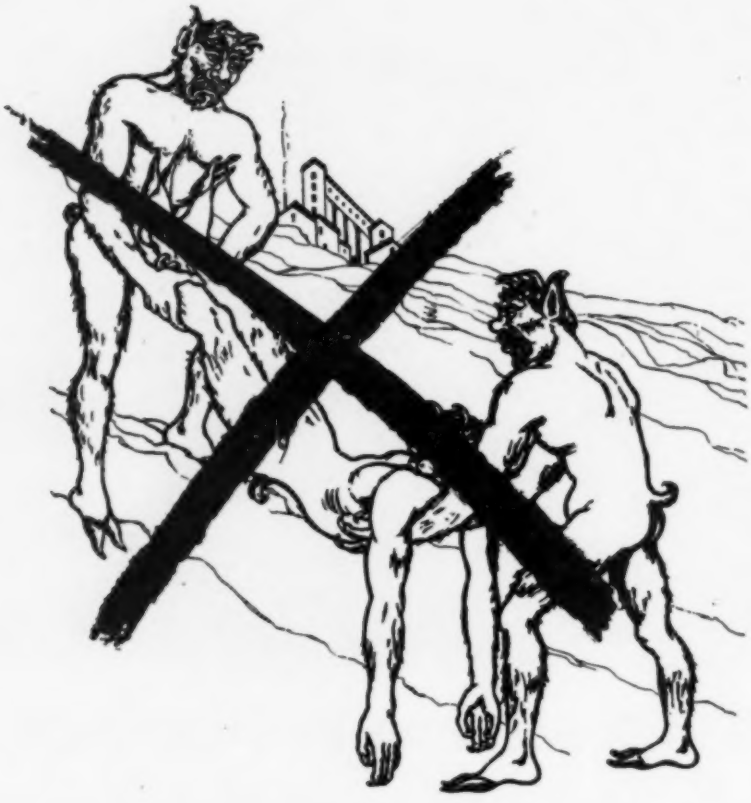
Why twin grommet construction? When an ordinary large-sized V-belt (right, above) goes into the sheave its sides are squeezed by the pulley, forcing the center cords downward and out of the line of load-carrying stress. Belt men call this "dishing", because the cord section becomes concave, like a dish. With twin grommet construction there are no center cords, no "dishing" — as the belt goes into the pulley the grommets remain on the job, close to the driving surfaces of the belt.

Grommet belts take shock load better, last longer — Laboratory and field tests show that grommet belts have a higher safety factor, greater ability to withstand shock load, than ordinary V-belts. Reasons: no "lost" or "lazy" cords to shirk, greater flexibility, better gripping power. Grommet belts tested lasted from 20 to 50% longer than ordinary V-belts. Reasons: no cord overlaps (85% of ordinary V-belts fail in the overlapped section), no sawing cords, less heat.

How to get genuine grommet V-belts — Twin grommet construction is an exclusive, patented B.F.Goodrich development — no other manufacturer can make grommet V-belts. Now available in "D" and "E" sections. To be sure you get genuine grommet V-belts see your B.F.Goodrich distributor. *The B.F.Goodrich Company, Industrial Products Division, Akron, Ohio.*

B.F.Goodrich
RUBBER FOR INDUSTRY

THEY'RE "MEN OF



Yes—the **FRICTION DEVILS**—those leaders in the business of increasing coal mining costs and slowing up coal production—are soon **EX'D** out when their only "tipple" is . . .

HULBURT QUALITY GREASE!

•

HULBURT OIL & GREASE CO., PHILADELPHIA, PA.

Specialists in Coal Mine Lubrication

EXTINCTION"

Thanks to

Hulburt *Quality* GREASE

The trouble-free operating life of coal mining equipment can be greatly EXtended—by the use of this distinguished quality lubricating product that does its one job EXtremely—not to say SUPREMELY WELL

users of HAZACORD REEL CABLE benefit from HAZAPRENE ZBF * SHEATH

Tough Hazacord Reel Cable now protected with this new Hazard Sheath that provides still greater safety, economy and efficiency in electric locomotive cable service

No other mining operation proves Hazacord's *ability to "take it"* better than the outstanding *service it gives* on mine locomotives. Here, as you well know, every potential enemy of long, safe cable life is encountered continuously. And today, Hazacord Reel Cable is an even better buy with the added Hazard development — the Hazaprene ZBF Sheath.

This sheath, through mold curing, takes on the density and toughness required to prevent tears or breaks . . . has a smooth surface that slides readily over sharp edges. Yet the flexibility of Hazaprene is ample to withstand the "ins and outs" of reeling. It's compounded with neoprene, to resist oils, chemicals, acid mine water, etc. The unusual flame-resistance of Hazaprene ZBF is fully explained in box at right.

* ZBF ZINC BORATE FORMULA

Flame tests have shown that Zinc Borate imparts greatly increased fire-resistant properties to neoprene compounds with burning rates reduced by as much as 20% and weight losses by as much as 40%. Afterglow is materially reduced also. Millions of feet of cable protected by this type of sheath were used during the war by the Navy for special operating conditions to gain extra fire protection. Hazaprene ZBF Sheaths mean not only greater safety because of unusual flame-resistance and lack of afterglow — but also longer life through increased resistance to abrasion, wear and tear.

The engineering of Hazacord Reel cable includes such advantages as heat-resisting insulation that takes current surges without damaging effects . . . and conductor, insulation and sheath are firmly bonded so there's no slipping or bunching as the cable is paid out and reeled in.

Make your next reel cable Hazacord, and then compare its long, safe service with your present standards. Hazard Insulated Wire Works, Division of The Okonite Company, Wilkes-Barre, Pa.

HAZARD

insulated wires and cables for every mining use

7343

Coal Age

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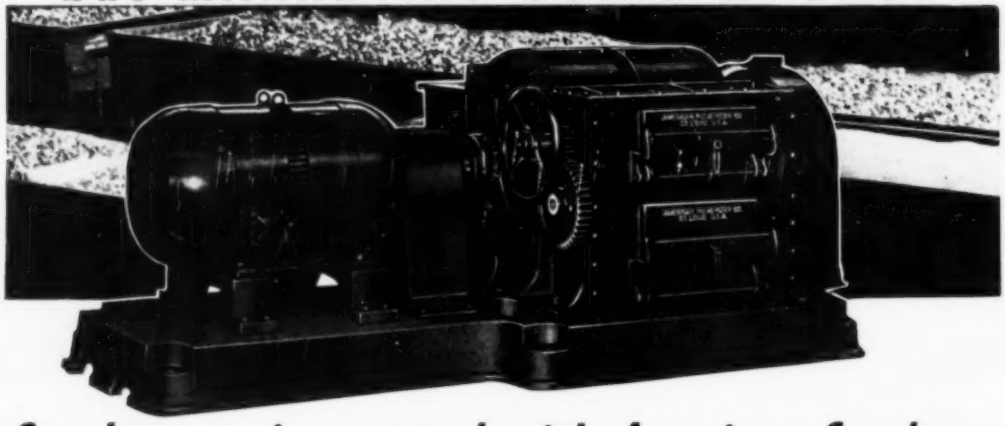
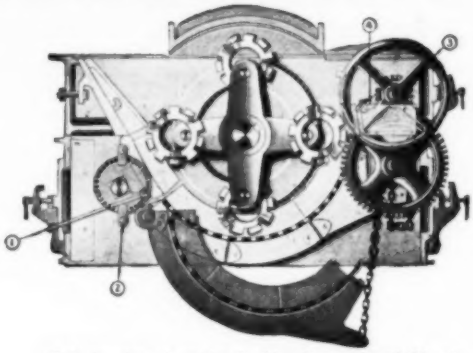
PRODUCTION *GOING STRONG* but MARKETING GOING WRONG?



Get better size control with American Crushers

When tonnage gains below ground are offset by improper ratios of unwanted, fines and unbalanced screen rejects, its time to survey and revise your coal crushing operation.

American Rolling Ring Crushers assure better size control with their exclusive, patented, shredder ring action. Reduction is readily controlled to obtain highly marketable or pulverizer sizes with minimum of carbon dust and with no oversize.



Only Americans have the shredder rings each with 20 cutting edges that split coal instead of crushing it. Revolving freely on its own shaft, each ring deflects from tramp iron, etc., which is propelled to metal trap.

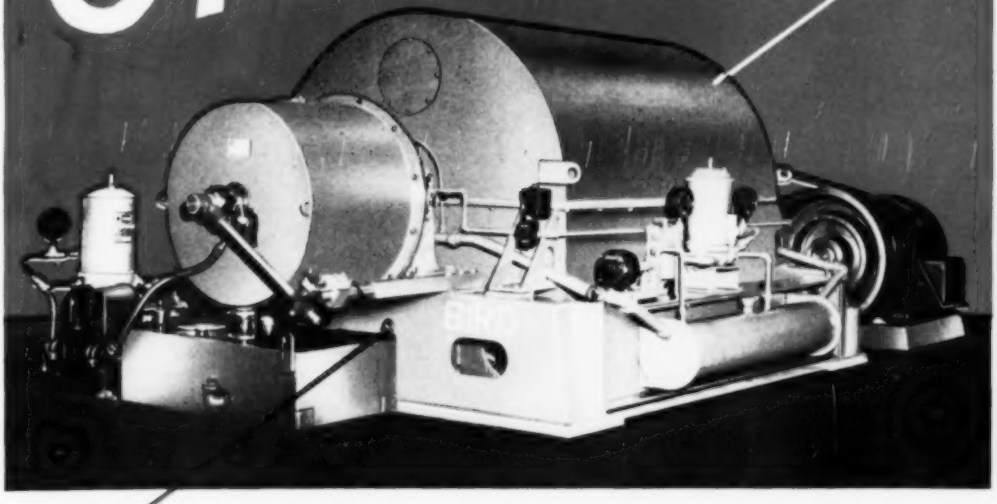
Send for special "AC Coal Crushing Bulletin"——yours for the asking.

American PULVERIZER COMPANY

Originators and Manufacturers of Ring Crushers and Pulverizers

1119 Macklind Avenue
St. Louis 10, Mo.

OK'd by the Coal Industry*



*as the best way to dry fine coal

Thousands of tons of fine coal are now being dried in Bird Filters every day.

Many units have operated for months without a shutdown for maintenance.

Filtrates are consistently low in solids and a closed water system is a reality.

Coal discharge is uniformly dry, as dry or drier than that which can be obtained with any other combination of equipment.

Ask us to mail you the new Coal Filter Bulletin.

BIRD MACHINE COMPANY, South Walpole, Mass.

The BIRD Continuous Centrifugal COAL FILTER

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presents MILTON BERLE
every Wednesday night.
METROPOLITAN OPERA
broadcasts every
Saturday afternoon.

TEXACO

TEXACO LUBRICANTS

KEEP HYDRAULIC SYSTEMS TROUBLE-FREE

Use the oil that gives extra protection against rust and sludge - Texaco Regal Oil (R&O)

YOU'LL find that the hydraulic mechanisms on your shovels, dump trucks and other equipment work more smoothly and efficiently, need less servicing and cost less to maintain when you use *Texaco Regal Oils (R & O)* as the hydraulic mediums.

Texaco Regal Oils (R & O) are turbine-grade oils — specially inhibited against rust and oxidation, and processed to prevent foaming. They keep hydraulic systems *clean* — free of rust and sludge formations that cause costly stoppages. Systems require fewer cleanings and drainings.

You can get *Texaco Regal Oils (R & O)* in viscosities suitable for every type and size of hydraulic mechanism . . . no "cutting back" is necessary. Leading hydraulic equipment manufacturers recommend *Texaco Regal Oils (R & O)*, and many ship their units already charged with them.

Let a Texaco Lubrication Engineer help improve the efficiency of your mining operations through more effective lubrication. Just call the nearest of the more than 2300 Texaco Wholesale Distributing Plants in the 48 States, or write The Texas Company, *National Sales Division, Dept. C.,* 135 East 42nd Street, New York 17, N. Y.

MOVE MORE TONNAGE — Lubricate car wheel bearings — plain, cavity hub or anti-friction — with *Texaco Olympian Grease*, and you can use more cars per train . . . move more tonnage more quickly. This fine lubricant resists oxidation, separation and leakage . . . gives longer-lasting protection against wear . . . makes cars start and move easier *even in winter weather.*

For the Coal Mining Industry

W-SPEED PATROL BD-3

BD-2 AD-3

AD-4

Choose the size

FROM ALLIS-CHALMERS' COMPLETE LINE

FOUR DIESEL-POWERED MODELS—all are full-fledged construction machines—each one easily handles all the work involved in the building and maintenance of haul roads—including cutting banks and ditches . . . also, with scarifier, for ripping up shale, rock, bony and to loosen coal beds...with snowplow, to keep roads open. Differences in weight, speeds, horsepower and cost enable you to match the machine to the job to be done.

LOW COST W-SPEED PATROL—an especially economical motor grader for maintaining haul roads. Small size and short turning radius make it ideal for operation on narrow roads. Available with broom for sweeping coal beds, driveways, snow, other uses. Gasoline powered, electric lights and starter, simple-to-operate controls.

Whatever your motor grader needs . . . your Allis-Chalmers dealer can fill 'em!

SAME OUTSTANDING ADVANTAGES ON ALL AD AND BD MODELS

ALLIS-CHALMERS

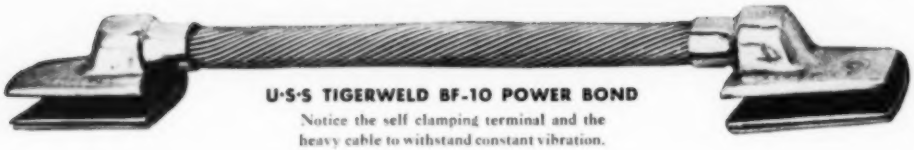
TRACTOR DIVISION · MILWAUKEE 1, U. S. A.

that fits the job

- A strong, shock-absorbing tubular frame that also protects control rods inside frame.
- High axle and throat clearance for handling bigger windrows without interference.
- Rounded construction of steering knuckles, spindles and drag links to prevent material from packing . . . assures unhindered operation.
- "Roll-away" moldboard that rolls instead of pushes material and thus speeds up work.
- A full circle revolving blade that allows grading forward or in reverse.
- A blade held firmly on its work, through direct down pressure, for precision cutting.
- A smooth-running, economical GM 2-cycle diesel engine that packs power in every stroke.
- Complete operator comfort with full vision, responsive controls, self-energizing brakes.

VERSATILE

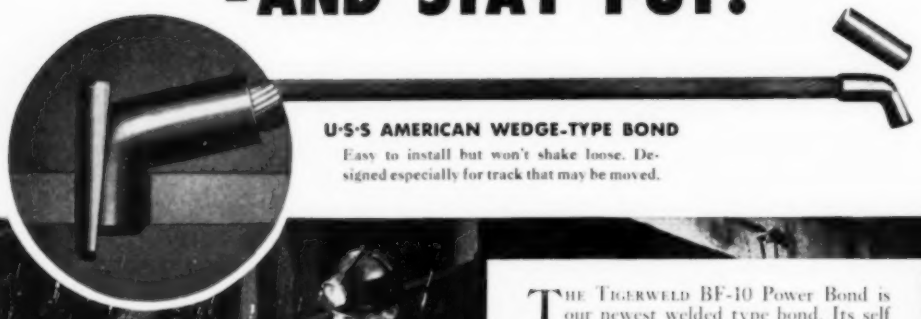
FOR ALL KINDS OF USERS
FOR ALL TYPES OF MAINTENANCE



U·S·S TIGERWELD BF-10 POWER BOND

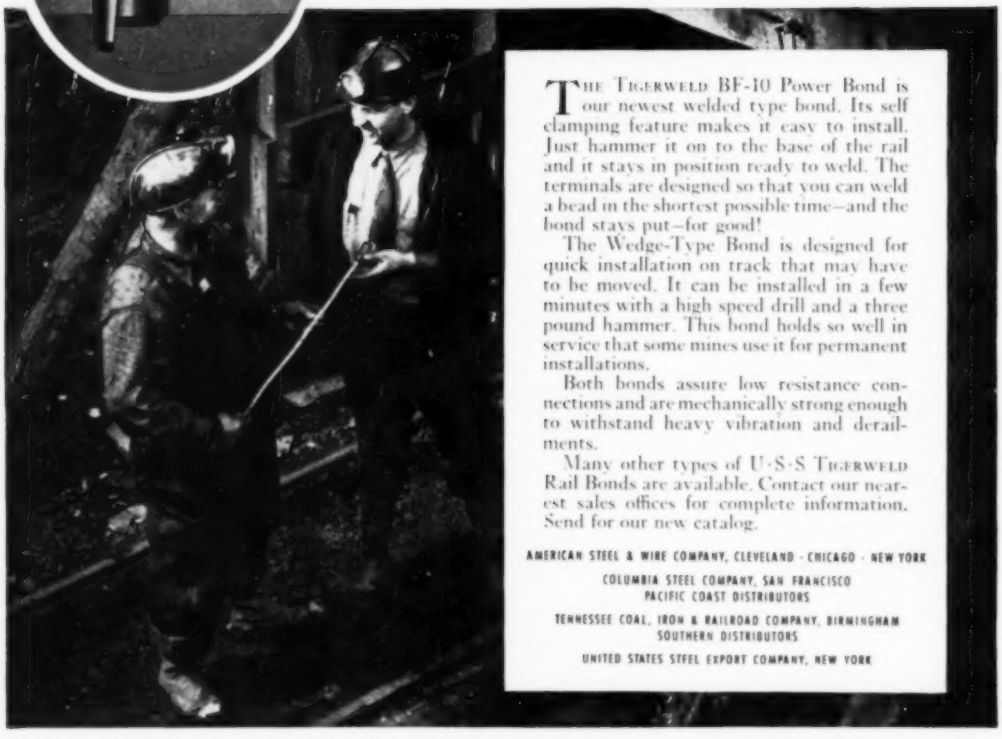
Notice the self clamping terminal and the heavy cable to withstand constant vibration.

THESE BONDS GO ON EASY -AND STAY PUT!



U·S·S AMERICAN WEDGE-TYPE BOND

Easy to install but won't shake loose. Designed especially for track that may be moved.



THE TIGERWELD BF-10 Power Bond is our newest welded type bond. Its self clamping feature makes it easy to install. Just hammer it on to the base of the rail and it stays in position ready to weld. The terminals are designed so that you can weld a bead in the shortest possible time—and the bond stays put—for good!

The Wedge-Type Bond is designed for quick installation on track that may have to be moved. It can be installed in a few minutes with a high speed drill and a three pound hammer. This bond holds so well in service that some mines use it for permanent installations.

Both bonds assure low resistance connections and are mechanically strong enough to withstand heavy vibration and derailments.

Many other types of U·S·S TIGERWELD Rail Bonds are available. Contact our nearest sales offices for complete information. Send for our new catalog.

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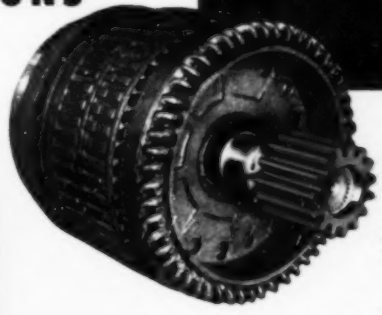
UNITED STATES STEEL

Genuine

PITTSBURGH GEAR TAPER SERRATED SHAFTS and PINIONS



33⅓% TO 50%

MORE STRENGTH AND LONGER LIFE!

If you're shadowed by repeated breakage of shafts and pinions on locomotive armatures and other equipment exposed to tough service it's time you switched to Genuine Pittsburgh Gear TAPER SERRATED SHAFTS AND PINIONS. They'll give you a third to a half more strength and longer life than those old-fashioned key and keyway types. Elimination of keyways preserves full metal strength on both shaft and under root of teeth on pinion. Instead they are V-LOCKED all around and can't shake loose. Easy to apply or remove.

Now available in many sizes for most coal mining operations. Write for information, or

SEE THE PITTSBURGH GEAR DISTRIBUTOR NEAR YOU

ARMORED GEARS
Reg U S Pat Off

PITTSBURGH GEAR COMPANY | 27th & Smallman Streets PITTSBURGH 22, PA.

GEARS AND PARTS FOR LOADERS, CUTTERS, LOCOMOTIVES

Hold Down Cost!

In Spite of Rising Expenses

The ROCKMASTER Blasting System Stabilizes Over-All Costs!

Sounds incredible in the face of rising costs of labor and blasting supplies. But it *is* true! Quarries, mines, stripping operations and construction projects hold down over-all costs with the ROCKMASTER Blasting System. Here's a case in point:

One company with the tough job of blasting hard limestone figures it saves $20,000 a year through the use of ROCKMASTER. They do less drilling, use less equipment, and have boosted their daily tonnage by five hundred tons. What's more, they have cut vibration and noise to a minimum—of prime importance to a quarry located within city limits!

When Atlas pioneered ROCKMASTER, it introduced a new concept of blasting. ROCKMASTER is a blasting *system* based on the right explosive and method of loading . . . the proper spacing of holes . . . the selection of the right milli-second delays—all based on the kind of rock being blasted.

Call in your Atlas representative. He'll be glad to show you how ROCKMASTER can help *you* hold down your blasting costs.

"ROCKMASTER"—Trade Mark
Manasite: Reg. U. S. Pat. Off.

ATLAS EXPLOSIVES
"Everything for Blasting"

CHEMICALS ATLAS EXPLOSIVES

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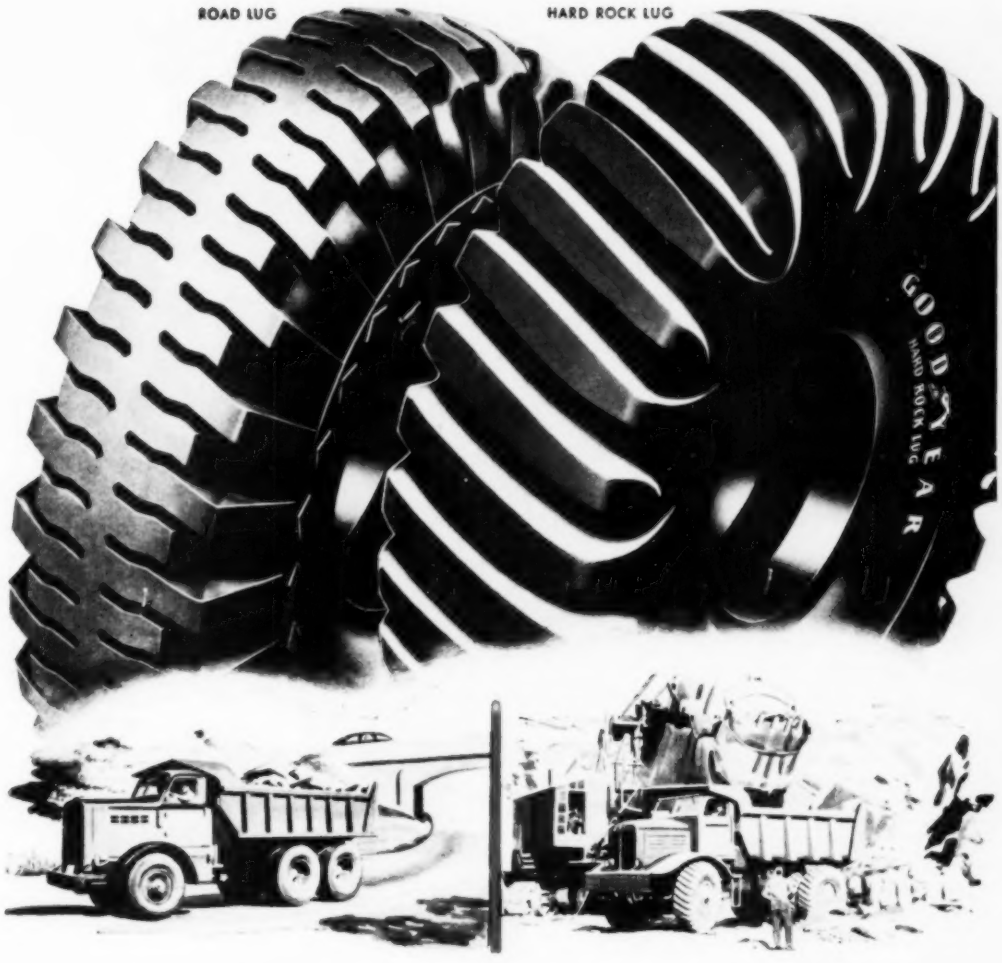


Tough tires for tough jobs!

FOR pit and quarry trucking, whether entirely OFF the road or OFF-AND-ON the road, these super-stamina Goodyear tires will give you lower-cost, longer-lasting performance.

The massive tread bars of the Hard Rock Lug provide extra traction, extra protection in tire-tearing rock work. And the alternate long—and short — bar tread of the Road Lug leads them all when it comes to combining extra traction off-the-road with smooth, long mileage on highways.

Both of these great tires have super-strong carcasses of heat-resisting rayon cord and extra-thick, bruise-resisting undertreads. So choose the one that suits *your* operation best — and discover why *more tons are hauled on Goodyear truck tires than on any other kind.* BUY and SPECIFY Goodyear . . . it pays!

We think you'll like "The Greatest Story Ever Told"— Every Sunday— ABC Network

GOODYEAR

Road Lug - T. M. The Goodyear Tire & Rubber Company

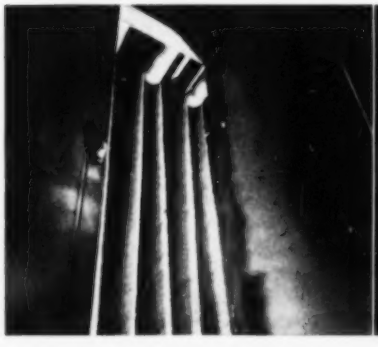
As seen in
America's newest and finest
Brattice Cloth Mill
making the new

UPSON-WALTON *Brattice Cloth*

★

Not merely dry—it's DRY PROOFED under ELECTRONIC CONTROL

Write for free copy of "Brattice Cloth Facts"



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THE UPSON-WALTON COMPANY

Manufacturers of Wire Rope, Wire Rope Fittings, Tackle Blocks, Brattice Cloth

Main Offices and Factory: Cleveland 13, Ohio

114 Broad Street, New York 4 · 3525 West Grand Ave., Chicago 51 · 241 Oliver Building, Pittsburgh 22

THAT'S what drivers for The McLaren Gold Mines Co., Cooke, Montana say of the General Motors Diesels powering their Euclid dump trucks. And they're speaking from really rugged experience.

The mine is at an altitude of 9600 feet. On a haul of 4½ miles over grades as steep as 16%—these trucks make 8 round trips per 9-hour shift. They work without a whimper—18 hours a day, 7 days a week.

GM Diesels are especially well suited to high-altitude operation because of their 2-cycle design. With power at every piston downstroke, they deliver twice the number of power impulses for each turn of the shaft. A built-in blower provides pressurized "Uniflow" scavenging which assures cleaner, more complete combustion. This gives them plenty of tough, fast-stepping horsepower that's quick to respond to a touch of the throttle.

No matter what your requirements may be, if you want sturdy, money-making power, be sure to look into General Motors Series 71 Diesel engines.

DETROIT DIESEL ENGINE DIVISION

SINGLE ENGINES Up to 200 H.P. DETROIT 28, MICHIGAN MULTIPLE UNITS Up to 600 H.P.

GENERAL MOTORS

DIESEL BRAWN WITHOUT THE BULK

GM GENERAL MOTORS DIESEL POWER

Gets 3-way loader economy

A switch to new Superla Mine Lubricant No. 0 stopped hard-carbon troubles in the transmissions of ten Goodman loaders in a large midwest mine. Cleaner, more reliable operation with this inhibited oil brought three-way economy . . .

UNINTERRUPTED LOADER OPERATION

1. Downtime and consequent loss of tonnage, previously caused by hard-carbon troubles in loader transmissions, were eliminated. All loaders, several on double-shift duty, have operated for 1½ years on Superla Mine Lubricant No. 0 without lubricating failures of any kind.

50% LOWER MAINTENANCE COSTS

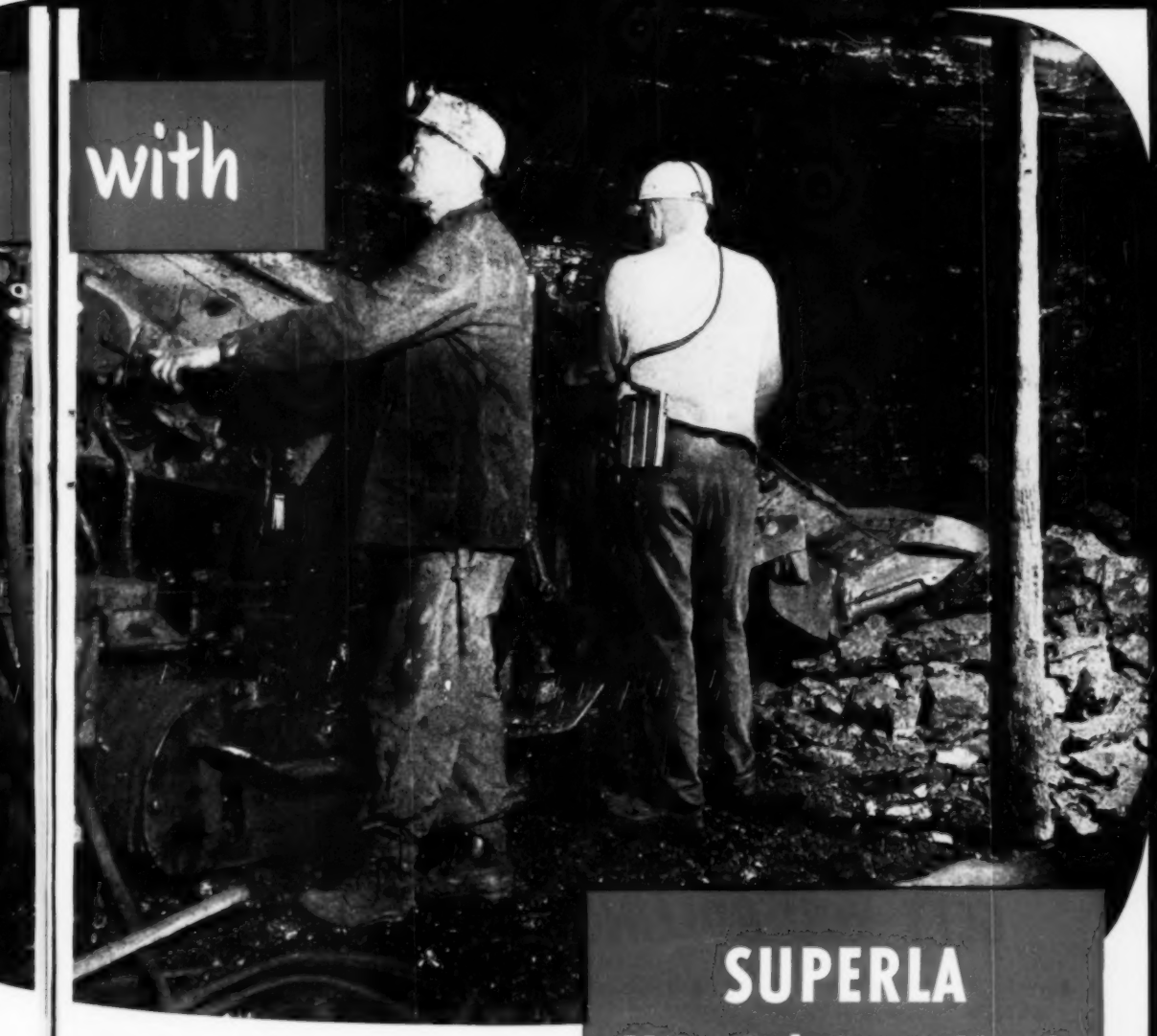
2. The mine's repair-shop records show a 50% reduction of loader-maintenance costs, for repair parts and labor, since shifting the machines to Superla Mine Lubricant No. 0.

EXTENDED OIL DRAIN PERIODS

3. Transmission oil-drain periods were extended from every 60 shifts to every 100 shifts, a saving both in oil consumption and servicing time. This drain practice was based on a five-month test of Superla Mine Lubricant No. 0 in one loader. During this time, laboratory analysis of transmission oil samples showed no oxidation or deterioration of the oil up to 120 shifts.

A test of new Superla Mine Lubricants in your equipment will prove their ability to provide continued operation of machines at lower maintenance costs. Grades are available for both grease- and oil-lubricated cutters and loaders. A Standard Oil Lubrication Engineer will help you make a test. Write Standard Oil Company (Indiana), 910 South Michigan Avenue, Chicago 80, Illinois.

STANDARD OIL COMPANY (INDIANA)



SUPERLA
Mine Lubricant No. O

6 Grades for lubricating any type of cutter or loader

No. 00. An oxidation-inhibited oil containing a detergent additive. It provides exceptionally clean operation and low oil consumption for oil-lubricated gear cases.

No. 0. A high-quality additive-type oil similar to No. 00 except that it is a slightly heavier grade. It is designed for Goodman loaders and cutters.

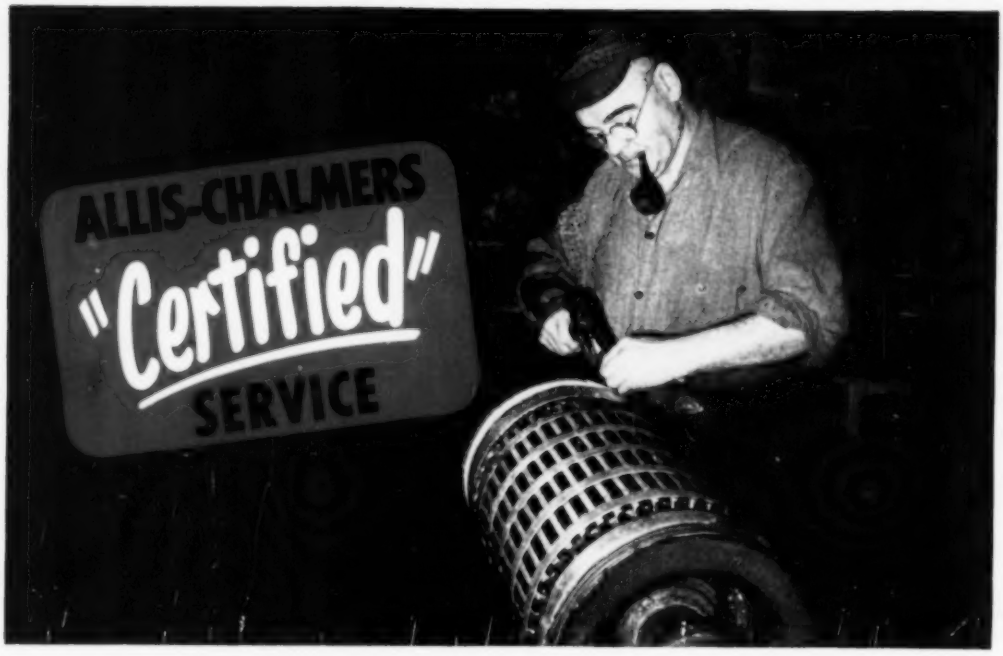
No. 2. A soft, semi-fluid grease for lubricating gathering-head gear cases where greater fluidity is desired than that usually provided by most loader greases.

No. 4. A semi-smooth grease particularly resistant to thinning out under heat and mechanical working. At the same time it can easily be poured from the barrel bung at ordinary mine temperatures. It is especially designed for Joy loaders.

No. 6. A grease of heavy consistency and good high-temperature characteristics. Its fibrous structure makes it particularly useful on mine car wheels and for general underground lubrication.

No. 8. A smooth grease having superior high-temperature characteristics. It is suitable for armature bearings and pressure-gun work where a grease of heavy consistency is desired.

STANDARD OIL COMPANY (INDIANA) STANDARD



Cuts Your Down Time

GETS YOU ROLLING AGAIN SOONER!

Example: Whether on Motors Under 200 hp, as Pictured, or as Big as the 2700 hp Motor that was Rewound and Running Again in Six Days for E. I. Dupont Co. — Service Stands Back of Charleston Electric Supply Co., Charleston, W. Va.

CHARLESTON ELECTRIC is a *typical* Allis-Chalmers Certified Service shop . . . the kind that is located in every major industrial center.

Yes, *you* can cut lost production time to the bone . . . get fast, expert service on motors, transformers and control by calling the authorized A-C Certified Service shop in your area whenever you need help.

A-C Certified Service Shops are hand picked from the best independent shops in industrial areas. Each meets exacting Allis-Chalmers standards for experience, highly skilled workmen, modern equipment and reputation for square dealing. Each uses nothing but factory approved methods and parts.

Ask Your A-C Dealer or Office—Most industrial areas are now served by A-C Certified Service Shops. For expert service — or for *new* motors from ½ to 25,000 hp — see your A-C Authorized Dealer or District Office. A 2643

ALLIS-CHALMERS, 968A SO. 70 ST.
MILWAUKEE, WIS.

Texrope and *Vari-Pitch* are Allis-Chalmers trademarks

Sold . . .
Applied . . .
Serviced . . .

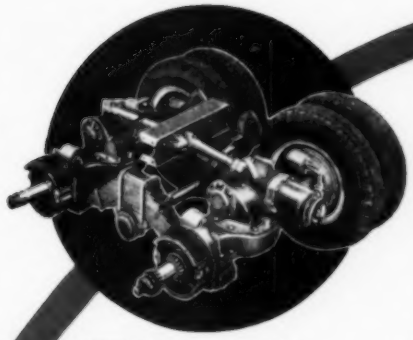
by Allis-Chalmers Authorized Dealers, Certified Service Shops and District Offices throughout the country.

MOTORS — ½ to 25,000 HP and up. Matching Allis-Chalmers Control.

TEXROPE — Belts in all sizes and sections, standard and Vari-Pitch sheaves, speed changers.

PUMPS — Integral motor and coupled types. Sizes and ratings to 2500 GPM.

ALLIS-CHALMERS



ONLY MACK offers this matchless Balanced Bogie with exclusive Power Divider. Unusual flexibility and balance insure even tire loading and uniform braking; cancel out weight transfer. Mack Power Divider assures good going by transferring power to wheels maintaining the best traction.

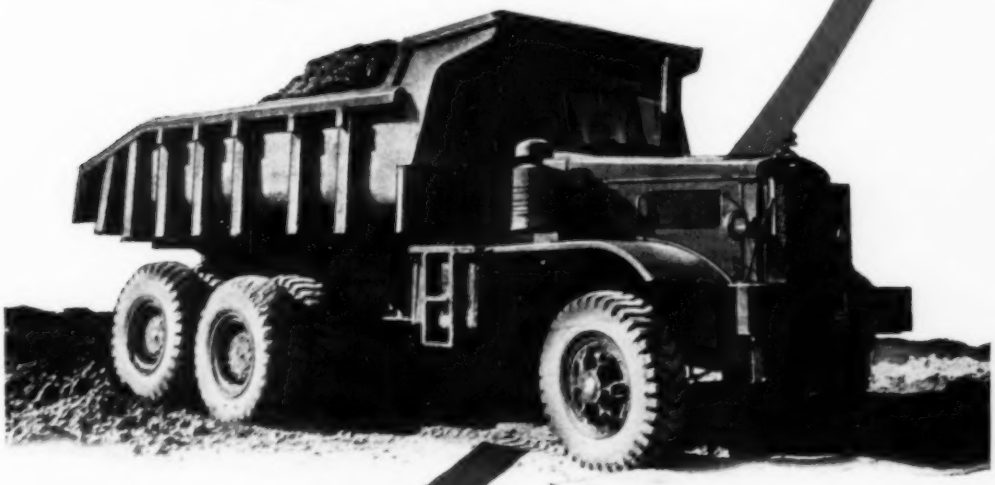
MACK TRUCKS
Built to *take it*
... and TAKE IT AWAY

in bigger loads ... on faster schedules ... with greater profits

Mack six-wheel trucks are built to "take it" when it comes to taking out the big loads with power and stamina to spare.

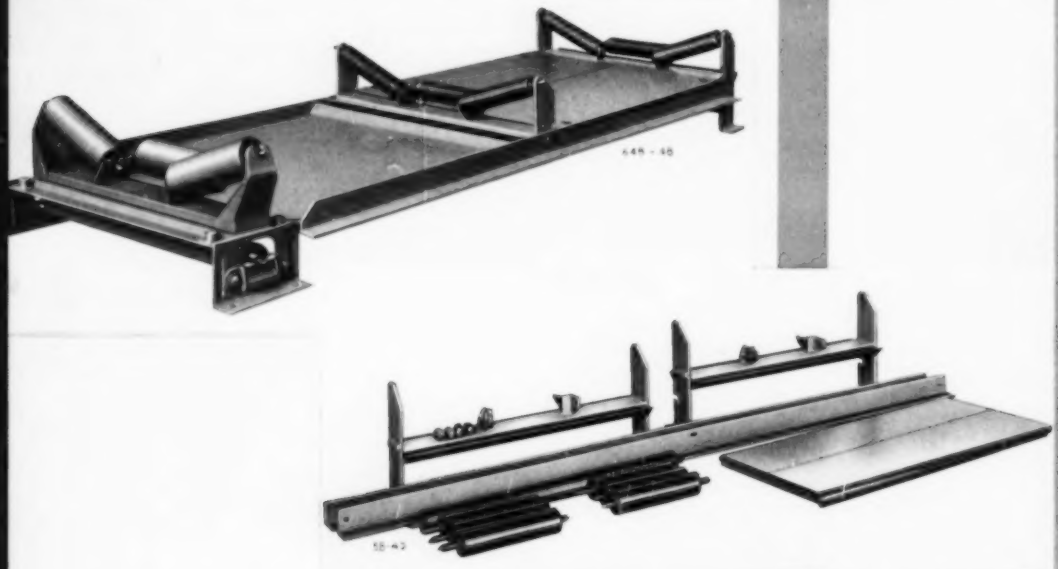
Powerful gasoline or diesel engines! Massive, heat-treated alloy steel frames! Flexible rubber Shock Insulators! Air Assist Clutch and Power Steering! Mack's famed Balanced Bogie and Power Divider! These are your assurance of power and strength for the heaviest loads; maneuverability and ease of control for fast loading and unloading; flotation and traction for the most slippery mud or sand.

Whether for heavy highway hauling or super-duty off-highway work, Macks are designed with more outstanding and exclusive features than any other truck—features that mean greater profits through stepped-up tonnage on faster schedules. It will pay you to get the full story in terms of your particular operation. Write or call your nearest Mack branch or dealer.



IT'S PART OF THE LANGUAGE: *Built Like a* **Mack** *Truck*

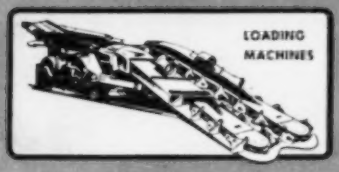
Mack Trucks, Inc., Empire State Building, New York 1, New York. Factories at Allentown, Pa.; Plainfield, N. J.; New Brunswick, N. J.; Long Island City, N. Y. Factory branches and dealers in all principal cities for service and parts. In Canada: Mack Trucks of Canada, Limited.

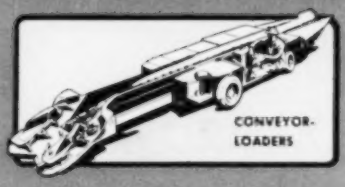


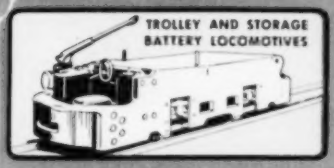
● For large capacities and long hauls Jeffrey Sectional Belt Conveyors are being used in many mines—continuous transportation at low cost. There is a Jeffrey Belt Conveyor to meet your operating conditions whether used between the room conveyors and pit cars in the cross entry or from room conveyors all the way to the outside of mine or to tipple. Main line conveyors have been operated as long as 3000 feet. Made in three widths for belts 26″, 30″ and 36″ wide.

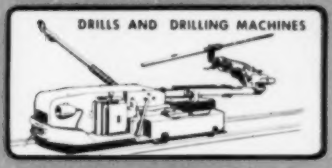
Shown above (top) is an intermediate pan section for a Jeffrey 64-A Conveyor, and under it you will see a standard 52-B intermediate section dismantled ready for moving. Some operators prefer the former because it permits moving entire unit in one piece while others prefer the knock-down type of construction. Jeffrey furnishes both.

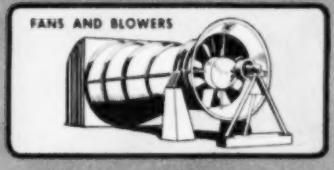
JEFFREY
Belt Conveyors

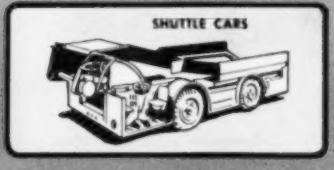


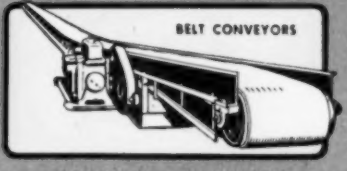


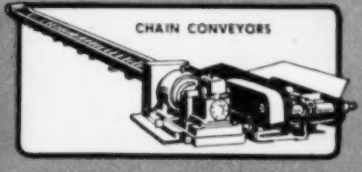


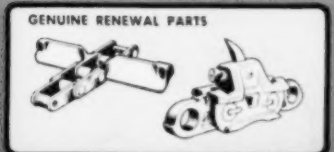












JEFFREY

EQUIPMENT FOR COAL MINES

and

GENUINE RENEWAL PARTS

THE JEFFREY MANUFACTURING COMPANY

Established 1877

General and Export Sales Offices

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Munsey Bldg.
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Bell Building
CINCINNATI 2,
Carew Tower
CLEVELAND 13,
Rockefeller Building
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Oliver Building
SALT LAKE CITY 1,
101 W. 2nd South St.
ST. LOUIS 1,
Railway Exchange Bldg.
SCRANTON 3,
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PITTSBURGH
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HARLAN, KY.
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LOGAN AND BECKLEY, W. VA.

FOREIGN PLANTS

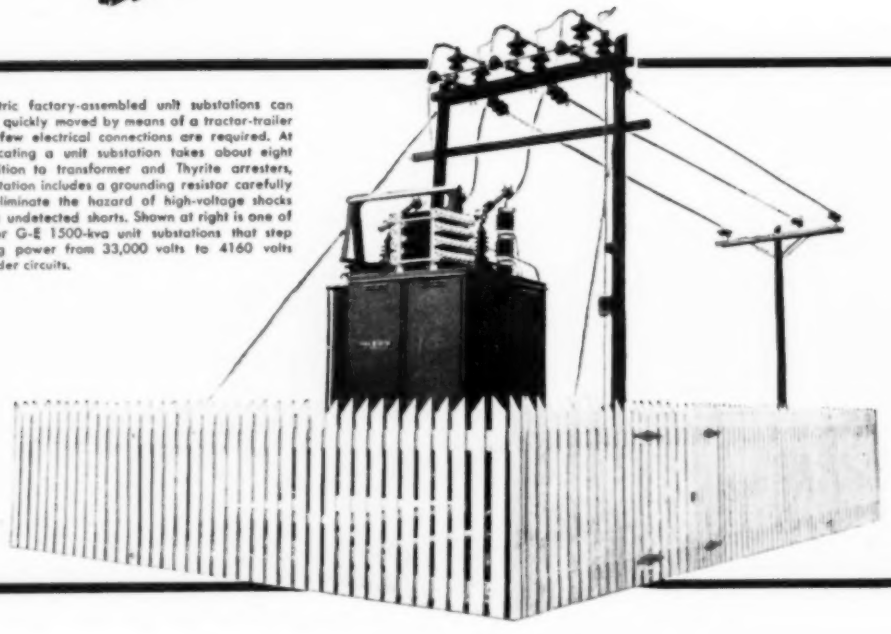
JEFFREY MANUFACTURING CO. LTD., Montreal, Quebec
BRITISH JEFFREY-DIAMOND LTD., Wakefield, England
JEFFREY-GALION (PTY.) LTD., Johannesburg

A Jeffrey Sectional Belt Conveyor is shown in the large illustration. Large tonnages may be handled in this manner—and quickly—and economically.

Room Conveyors (top-left) discharging onto a Jeffrey butt entry sectional belt conveyor. Discharging into mine car at the main entry is the other end of this conveyor (bottom-right).

"the saving is tremendous!"

General Electric factory-assembled unit substations can be easily and quickly moved by means of a tractor-trailer unit. Only a few electrical connections are required. At Maumee, relocating a unit substation takes about eight hours. In addition to transformer and Thyrite arresters, each unit substation includes a grounding resistor carefully designed to eliminate the hazard of high-voltage shocks resulting from undetected shorts. Shown at right is one of Maumee's four G-E 1500-kva unit substations that step down incoming power from 33,000 volts to 4160 volts for use in feeder circuits.



GENERAL ELECTRIC

"$6000 A YEAR SAVED IN POWER COSTS . . . RELOCATING COSTS CUT IN HALF!"

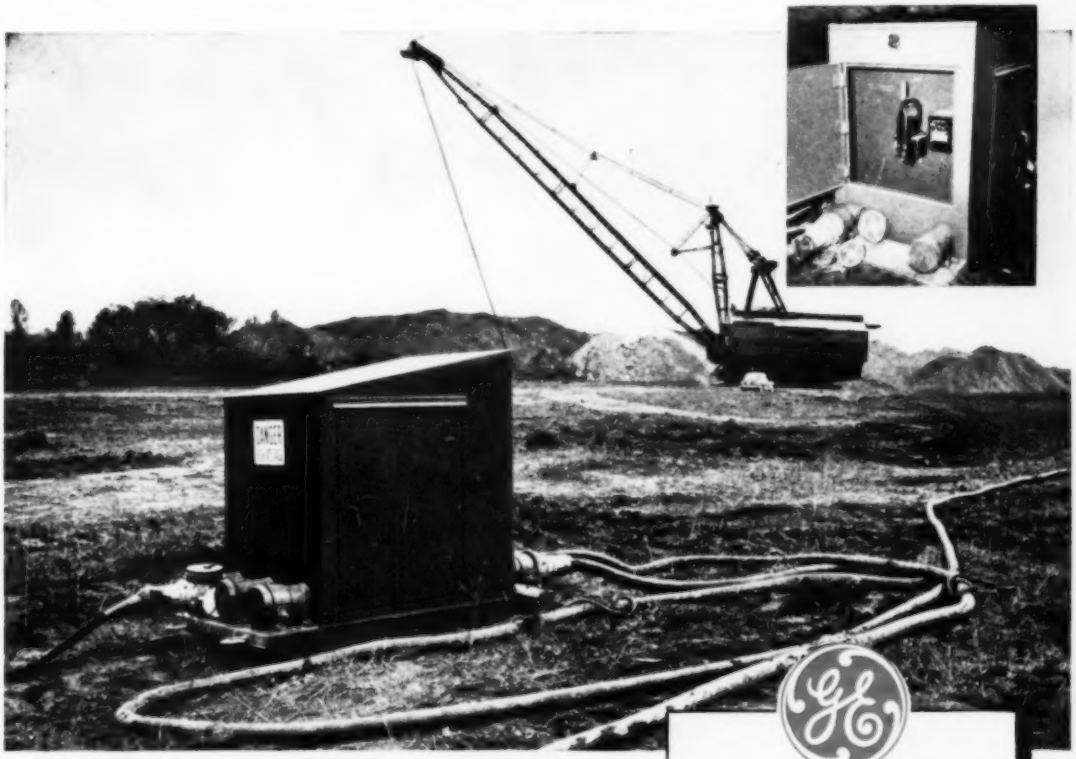
That's what Mr. Evans Bennington, Supt. of Electrical Maintenance at Maumee Collieries, says of their co-ordinated G-E power distribution system for strip mining units.

Here's an outstanding example of modern, efficient mine power distribution—the Maumee Collieries Company's strip mining operations at Terre Haute, Indiana. A fully co-ordinated General Electric system, it teams up unit substations, cable, and cable-skid switch houses to cut production delays with better voltage at the pit, provide maximum safety to workmen and equipment, and reduce moving time and costs.

"Use of G-E cable and cable skids," says Mr. Bennington, "has given us a most flexible power-system arrangement for feeding shovels, draglines, loaders and other excavating equipment. The initial cost of a cable distribution system, compared with an overhead line, is approximately the same. But the cost of moving the cable system is about one-half or less the cost of moving an overhead line system. When you consider that this system has to be changed on an average of at least every six months, the saving is tremendous.

"By buying power at 33,000 volts, we have been able to combine three metering points into one. This has resulted in putting two of the operations in the low kilowatt-hour bracket. In addition, the power company gives us a 10 percent rebate for owning our own substation, which, combined with the kilowatt-hour savings, saves us about $6000 a year."

You can bring new speed, flexibility and safety—plus new economies—to your surface mining operations with a completely integrated G-E power distribution "package". A G-E engineer with years of experience in mining problems will gladly give you the facts. Call him at your nearest G-E office. *Apparatus Department, General Electric Company, Schenectady 5, N. Y.*



This newest-type General Electric cable-skid switch house, one of twelve in use by Maumee, provides maximum portability and convenience plus more selective tripping. Unit, weighing 1600 lbs., measures 40 in. wide, 48 in. deep, 51 in. high in front and 43 in. high in rear, exclusive of skid. Front has two sockets for incoming trunk-line cable connections (see inset, above). From the three load outlets at the rear, portable cable brings power to strip mining units. Most of Maumee's 35,000 to 40,000 feet of portable cable is G-E Type SH-D, highly resistant to rough handling and excessive flexing.

POWER DISTRIBUTION SYSTEMS

—to cut mining costs per ton!

NO BUMPS... NO BLOWS... NO BURNS →→→

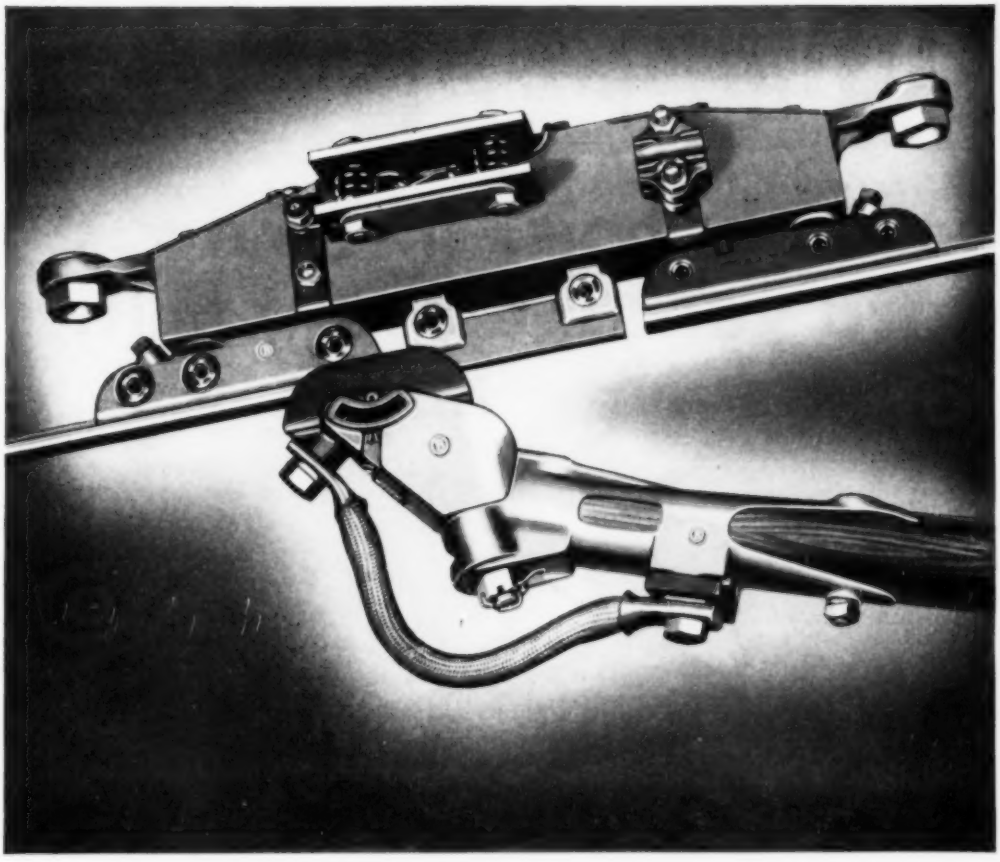
O-B Smooth-Underrun Fittings Can Make Your Trolley Overhead As Smooth As One Continuous Piece of Wire from Face to Tipple

No longer need you tolerate "bumps, blows and burns" in your overhead system . . . a destructive trio caused by wire encircling fittings. Such fittings are a constant source of arcing and wire burning, shortening the life of wire and collectors. By building with O-B Smooth-Underrun Fittings, you can obtain a trolley wire that is as smooth as one continuous piece from face to tipple.

Instead of surrounding the wire with excess metal at attachment points, O-B Smooth-Underrun Fittings grip the upper lobe only, leaving the lower running surface of the wire free and unobstructed. Separable anchor tips provide a smooth, level transition for current collectors at frogs and cross-overs. All runner pieces are designed with a cross-section similar in size and shape to that of actual wire.

Because of this smooth-underrun principle, your locomotives can operate safely at higher speeds; fewer dewirements will occur; both wire and collector life will be lengthened. For your next trolley overhead system, insist on O-B Smooth-Underrun Fittings.

3009-M



Typical of O-B's complete line of Smooth-Underrun Material, the new Type-T Section Insulator eliminates the wire-encircling bumps found in previous designs. Notice how the end runner jaws grip the trolley wire by the upper lobe only, leaving a free and unobstructed running surface for the current collector. The center runner may be adjusted so that the underrun surface is continuous at the same level. Other O-B Smooth-Underrun devices include Bulldog Trolley Clamps and Splicers, Type-M Frogs and Crossovers, and Types-R and T Section Insulator Switches.

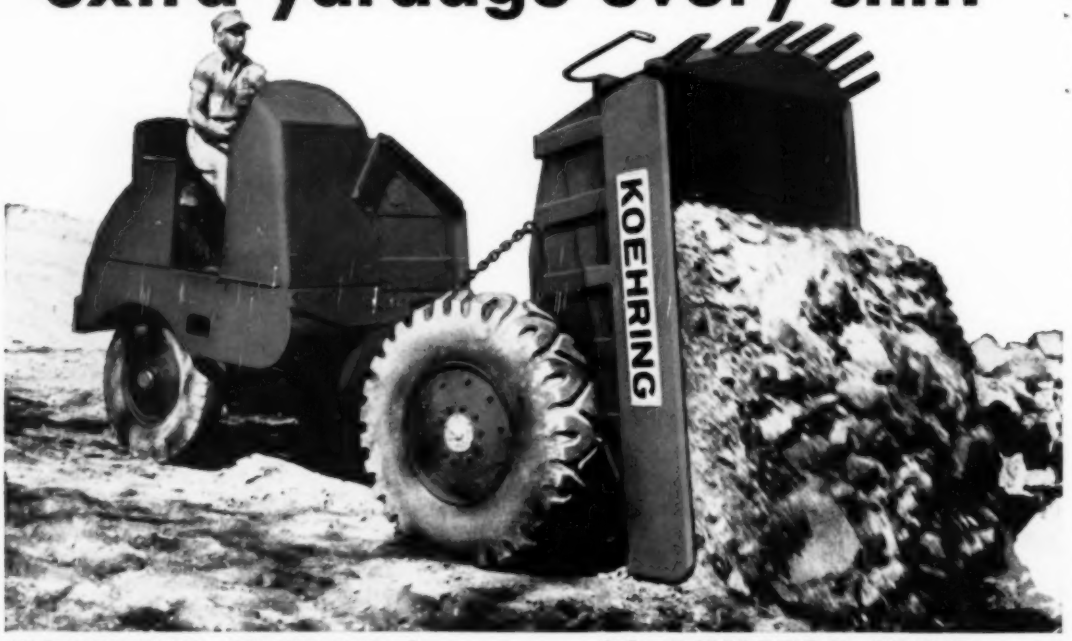
Ohio Brass

MANSFIELD, OHIO

Canadian Ohio Brass Company, Ltd.
Niagara Falls, Ontario

KOEHRING DUMPTOR

No body hoist trouble . . . extra yardage every shift



KOEHRING SHOVELS keep up with DUMPTOR SPEED

Koehring 304 (¾ yard) Rock Shovel: Heavy Duty leader in ¾ yard class. Enclosed gears run in continuous oil bath

Koehring 605 (1½ yard) Rock Shovel: Exclusive power clutch eliminates operator fatigue. Boom-foot shock absorber permits greater speed in rock.

DUMPS IN 1 SECOND

Pull the release lever and gravity instantly tips the scoop-shaped body 90 degrees. One second later, load is dumped . . . you're ready to go for another load.

You don't waste 10 seconds, 20 seconds, 60 seconds. Kick-out pan keeps body clean in any material.

Because Dumptor has no body hoist, you have no body hoist trouble. Dumps fast even in zero weather. Saves all body hoist maintenance expense.

NO TURN-TIME, MORE HAUL-TIME

You save more seconds every trip, because Dumptor never turns on shuttle hauls. Three reverse speeds are just as fast as three forward speeds. Constant mesh transmission is especially designed for shuttle work.

DRIVE AXLE STANDS UP UNDER SHOVEL LOADING: Dumptor is built by a shovel manufacturer for work with rock shovels. Drive axle is 4" chrome nickel steel, heat treated. Steel case protects entire assembly. Welded steel body is heavily reinforced. Steering axle oscillates to absorb frame twisting shocks of haul road travel.

EASIEST TO MAINTAIN

Everything accessible. One man can do complete grease job in 5 minutes. Clutch removed in fraction of time it takes to remove a conventional clutch, because engine is not moved, transmission case is not touched. Every gear in transmission is removable through one cover.

YOU'LL NEED FEWER UNITS — IF THEY'RE DUMPTORS

Job studies prove 3 6-yard Dumptors can easily handle shovel output formerly requiring 4 other 6-yard hauling units. Generally, there is a saving of 20 to 25 per cent in number of units on jobs within Dumptor range of haul.

Experienced Dumptor engineers are ready to survey your off-the-highway haul problems.

Contact your Koehring Distributor today.

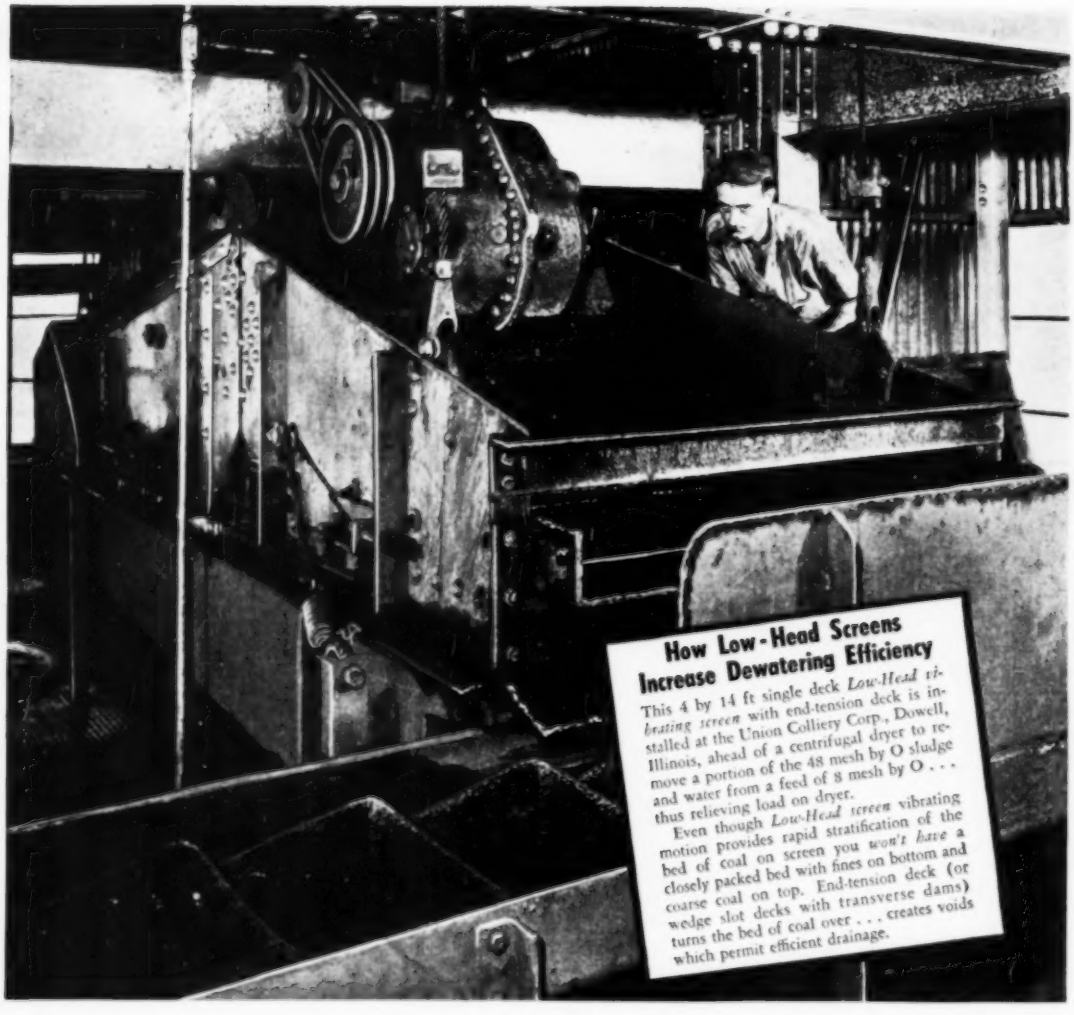
KOEHRING HEAVY DUTY

NO BODY HOIST TROUBLE
because Dumptor has no body hoist. Gravity tips body instantly, returns it automatically when empty.

KOEHRING COMPANY, Milwaukee 10, Wisconsin

Subsidiaries: JOHNSON • KWIK-MIX • PARSONS

How to Cut Dewatering Costs...



How Low-Head Screens Increase Dewatering Efficiency

This 4 by 14 ft single deck *Low-Head vibrating screen* with end-tension deck is installed at the Union Colliery Corp., Dowell, Illinois, ahead of a centrifugal dryer to remove a portion of the 48 mesh by O sludge and water from a feed of 8 mesh by O . . . thus relieving load on dryer.

Even though *Low-Head screen* vibrating motion provides rapid stratification of the bed of coal on screen you *won't have* a closely packed bed with fines on bottom and coarse coal on top. End-tension deck (or wedge slot decks with transverse dams) turns the bed of coal over . . . creates voids which permit efficient drainage.

AND GET INCREASED CAPACITY, TOO — WITH LOW-HEAD DEWATERING SCREENS!

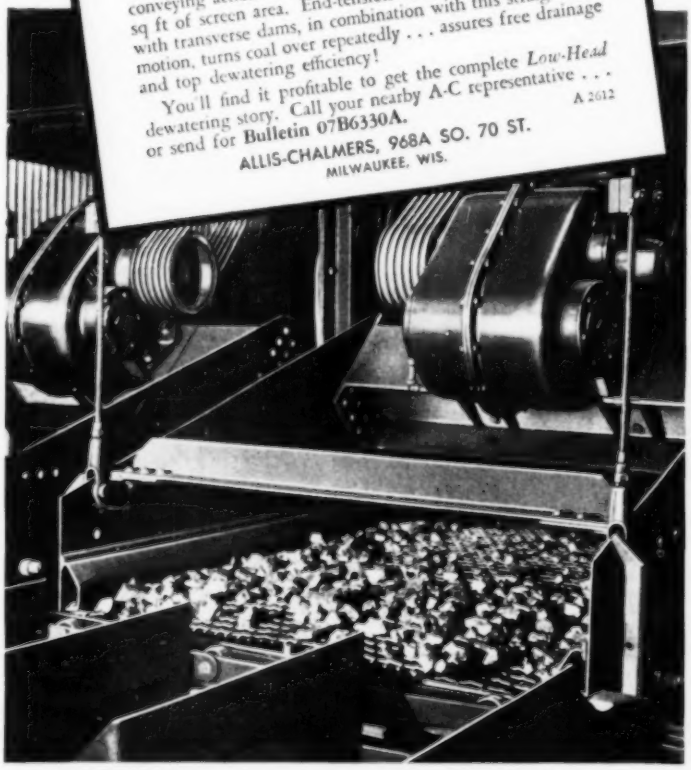
SPECIFY *LOW-HEAD vibrating screens* with reverse end-tension deck for sludge screening and dewatering small coal. For dewatering large coal and for pre-wetting ahead of heavy density units specify *Low-Head screens* with side tension deck.

Here's why: The *Low-Head screen* operates horizontally — saves headroom . . . saves installation costs. Straight-line vibrating motion at 45° to the horizontal results in a definite conveying action and in maximum dewatering capacity per sq ft of screen area. End-tension deck, or wedge slot deck with transverse dams, in combination with this straight-line motion, turns coal over repeatedly . . . assures free drainage and top dewatering efficiency!

You'll find it profitable to get the complete *Low-Head* dewatering story. Call your nearby A-C representative . . . or send for **Bulletin 07B6330A.**

A 2612

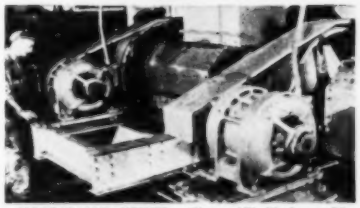
ALLIS-CHALMERS, 968A SO. 70 ST.
MILWAUKEE, WIS.



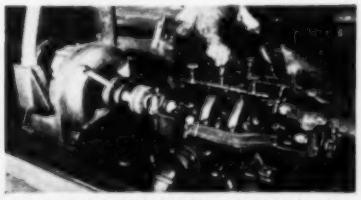
LOW-HEAD SCREENS are also used for wet or dry sizing. They combine high strength and light weight. Welded parts are "stress-relieved" to eliminate strain around welds. Support frames are designed to provide long screen surface life. Sizes 3 by 6 to 6 by 16 ft.

Low-Head, Vari-Pitch, Texrope are Allis-Chalmers trademarks

OTHER COST-CUTTING TONNAGE-INCREASING PRODUCTS FOR COAL



MOTORS AND DRIVES — These Allis-Chalmers 25 hp motors and Texrope drives supply reliable power for stoker coal crushers in coal cleaning plant. Complete Allis-Chalmers motor line, 1 hp and up, includes explosion-proof motors approved for Class I-D or 2-G locations. **Bulletin B6052H.**

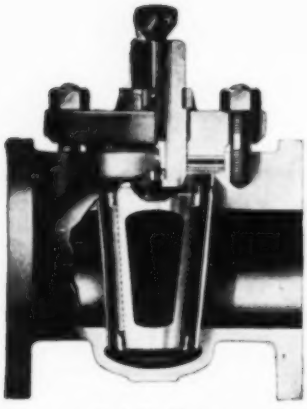


MINE DEWATERING PUMPS — 60 sizes of multi-stage high head pumps are built by Allis-Chalmers, with heads to 2,000 ft; capacities to 10,000 gpm; 2 to 7 stages. Above is two stage pump rated 150 gpm; 800 ft head; 3,500 rpm, used in mine dewatering service. Can be serviced without disturbing piping.

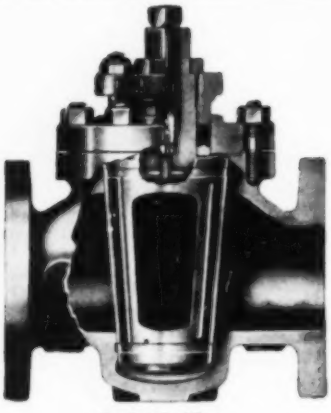
VARI-PITCH SPEED CHANGER on conveyor drive provides 300 to 375 percent speed change with the turn of a hand wheel. Two wide-range, worm adjusted sheaves are combined in a compact, enclosed unit. Adjustable to fractions of a revolution. **Send for Bulletin 20B6013C**

ALLIS-CHALMERS

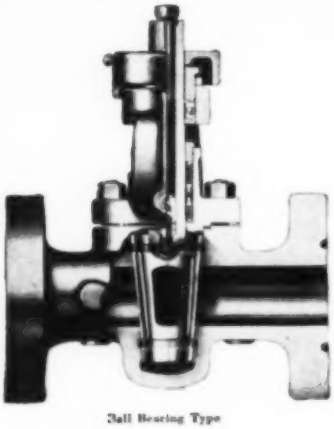
. . . Builds for Coal Progress!



Single Gland Type



Regular Gland Type



Ball Bearing Type

FOR HANDLING

Acids... Solvents... Sludges...

and other troublesome liquids—

USE WALWORTH LUBRICATED PLUG VALVES

When handling acids, condensates, dyes, oils, solvents, solutions, slurries and hundreds of similar "troublesome" liquids, you get better control, more dependable service and lower operating costs with Walworth Lubricated Plug Valves.

These valves have proved their ability to give easy operation . . . fast action . . . tight shut off . . . greater protection against corrosion. Turning is smooth and easy; just a ¼ turn from full-opening to full-closing. Moreover, Walworth Lubricated Plug Valves are tightly sealed against leaks — *whether open or shut.*

Walworth Lubricated Plug Valves are available in sizes ½" to 26" for pressures from 125 to 5,000 psi, and for vacuum requirement. For further information about Walworth's Complete Line of Lubricated Plug Valves, see your Walworth distributor or write for Catalog No. 46L.

WALWORTH
valves and fittings
60 EAST 42nd STREET, NEW YORK 17, N. Y.

NEW!—Whitney Type A Flexible Coupling now features plastic covers for reduced weight and efficient high speed operation.

WHITNEY ROLLER CHAIN
Flexible Couplings

For
Positive, Yet Flexible
Direct Drives

Here's a Flexible Coupling that supplies the equipment manufacturer and machine user with a *practical* and efficient unit for connecting power equipment to direct drives. Note the simple, all-steel construction . . . no short-lived materials to wear out or replace! Precision Roller Chain, assembled around accurately cut, hardened steel sprockets provide positive operation with inherent flexibility . . . assures long life. Additional Whitney features include: ease of installation, compactness, allows for motor end play, disconnects without removing shafts and bearings, allows for slight shaft misalignment. These are good reasons why you should specify and use Whitney Flexible Couplings for lasting, all-round performance and machine protection.

Whitney Roller Chain Flexible Couplings are adaptable to a wide range of transmission service, covering light, medium or heavy loads. You can use them to connect electric motors, gasoline engines, diesel engines, steam engines, etc., to any direct drive units, such as pumpers, compressors, blowers, beaters, speed reducers, —in short, to any of your production machinery where a positive but flexible direct drive is required.

Available from factory or distributor stock in popular sizes covering a wide range of application — from fractional to hundreds of horsepower. For complete information and engineering bulletin, write us today.

OTHER WHITNEY CHAIN PRODUCTS

- Roller Chain—single and multiple widths
- Silent Chain
- Conveyor Chain
- Cut Tooth Sprockets

Whitney Chain & Mfg. Co.
Division of Whitney-Hanson Industries, Inc.
210 HAMILTON STREET, HARTFORD 2, CONN.

WALTER TRACTOR TRUCKS *give you economical* HIGH TONNAGE HAULING *—without penalty!*

IT TAKES more than just "big trucks" to enjoy the full benefits of high-tonnage hauling. Too often, you pay the penalty of difficult handling—poor maneuverability—excessive tire wear—inability to run on soft or slippery surfaces.

Not so with Walter Tractor Trucks. They are specially designed and built to provide high-tonnage, low-cost hauling. Big—powerful rugged—maneuverable, Walter Tractor Trucks have the exclusive 4-Point Positive Drive which converts every horsepower into tremendous haulpower, by providing 100% traction in all four driving wheels. Payloads of 20-30-40 tons are hauled fast and handled easily under severest running conditions, curves and grades.

Write for detailed folder "High Tonnage Hauling with Walter Tractor Trucks."

• Less damage to tires and roads

With the smooth traction of Walter 4-Point Positive Drive, there is never wheel-spinning to grind tires and roads. Walter Suspended Double Reduction Drive reduces unsprung weight, which cuts down bouncing and pounding of wheels, reducing wear on tires and road. Tire life is increased 50-100% in most instances.

• Easily handled and maneuvered

—in the pit—on grades and curves—at dumping points. Very short wheelbase permits sharp maneuvering in confined spaces. Hydraulic power steering provides effortless turning. Powerful air brakes keep loads under safe control.

Upper: 300 hp. Walter Tractor Truck with 30 ton bottom dump coal trailer.

Right: 200 hp. Walter Tractor Truck, 20-ton payload capacity, for dump body service.

WALTER
4-POINT POSITIVE DRIVE
TRACTOR TRUCKS

WALTER MOTOR TRUCK CO. 1001 19 IRVING AVENUE, RIDGEWOOD 27, QUEENS, LONG ISLAND, N. Y.

JUST THROW THE LEVER

And watch this stand-and-signal combination go into action

The switch stand is Bethlehem's old reliable 1217, a type that's been sold by the hundreds of thousands. But here, something new has been added—a built-on reflector target that changes automatically, through a 90-degree arc, when the switch points are thrown. It's simple, positive, foolproof.

The signal is equipped with 3-in. red and green Stimsonite reflectors that stand out like cat's eyes when light is beamed on them. The motorman can see them so far away that he can control his trip with unusual safety. The brakeman, too, is aided by these large, brilliant reflectors. They pick up his light and he's able to locate the stand in a jiffy.

The reflector target is an integral part of the Model 1217 stand.* There are no extra connecting rods to install, no extra holes to drill in switch rods, no tie extension. The positions of the red and green reflectors can easily be reversed; simply remove two bolts and invert the target-blade assembly.

Compact? The top of the target is a bare 12 in. above the ties. And being an integral part of the switch stand, the signal presents no installation problems.

Ask a Bethlehem man to demonstrate. This is something with *real, practical advantages.*

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

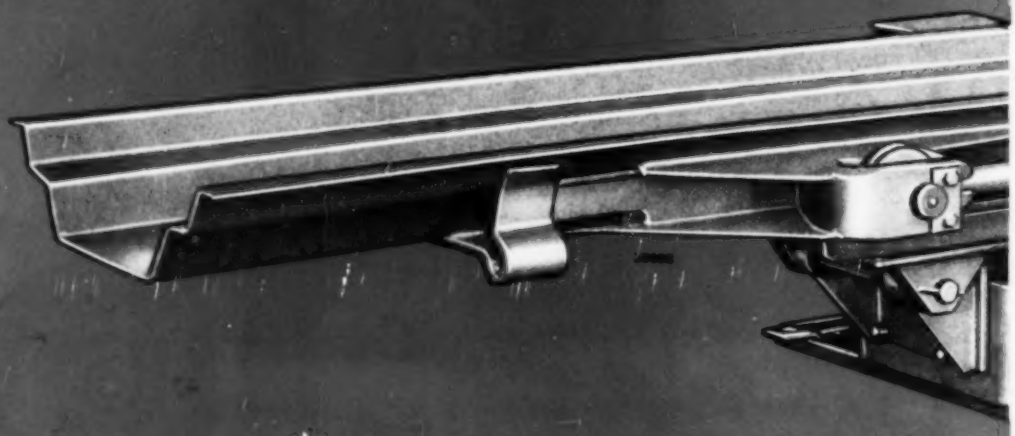
On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation
Export Distributor: Bethlehem Steel Export Corporation

* Bethlehem's Model 1217 Switch Stand can, of course, be furnished without the target—just as in the past. However, when the *combination* is ordered, specify Bethlehem Model 1217 Switch Stand with Reflector Target, and state whether Design 829 Spring Rod or Design 8-VM Rigid Rod is to be furnished with the stand.

★ BETHLEHEM STEEL ★

The GOODMAN L-20

BRINGS HIGH SEAM CAPACITY TO LOW COAL



HIGH CAPACITY

Will handle heavily loaded, largest size, full length pan line. Peak loads of any duckbill-loader fused into one continuous flow of coal.

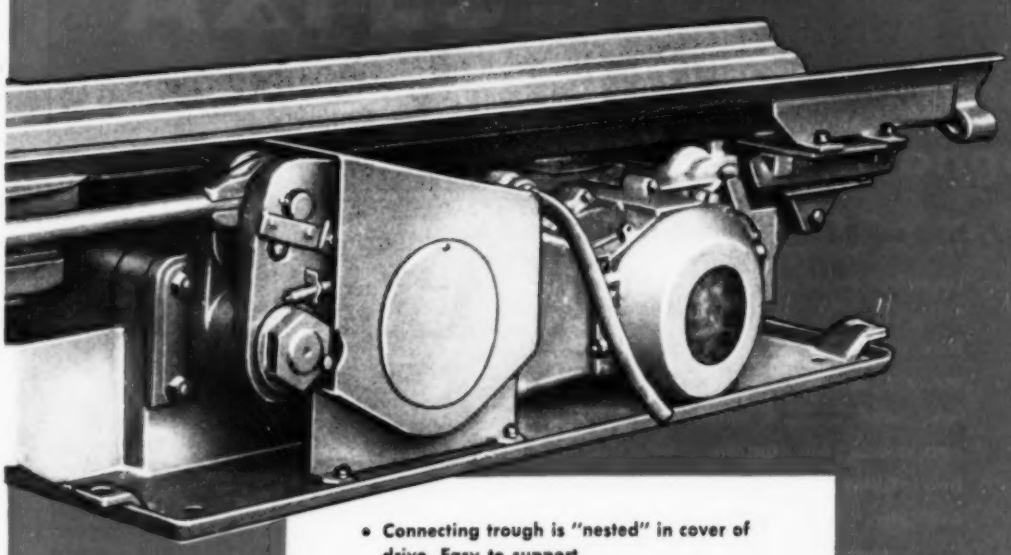
LOW HEIGHT

Over-all height of complete unit is but 25 inches, with drive underneath connecting trough for direct transmission of power to pan line.

LOW MAINTENANCE

It's a single, compact piece of equipment with few parts. Smooth, uniform motion reduces wear and strain, promotes easier operation of accessory equipment.

SHAKER CONVEYOR DRIVE



- Connecting trough is "nested" in cover of drive. Easy to support.
- Goodman permissible motor designed and built for the job.
- Coal line height—16" min., 23" max.—right for discharge onto belts.

You will want complete details of this latest addition to the Goodman line of shaker drives. A sales engineer will be glad to call.

GOODMAN MANUFACTURING COMPANY

HALSTED STREET AT 48TH • CHICAGO 9, ILLINOIS

In England: UNITED STEEL COMPANIES, LTD.

Grip the Sides of

ANY V-Belt...

FEEL the Sides CHANGE SHAPE

as the belt Bends—

-That SHOWS you Exactly WHY

THE CONCAVE SIDE

(U. S. PATENT NO. 1813698)

SAVES You MONEY

Bend any V-Belt and you can actually feel its sides change shape.

That's because the bending puts the top of the belt under *tension*, while the body undergoes *compression*. Naturally the sides of the belt *bulge out*—and if the belt is built with *straight sides*, you get the result shown in Figures 1 and 1-A, below:—

Straight-Sided V-Belt

How Straight-Sided V-Belt Bulges in Sheave-Groove.

Clearly, the bending forces a straight-sided V-Belt into a shape that does not fit the sheave-groove—and the bulging produces excessive wear along the *middle* of the *sides*.

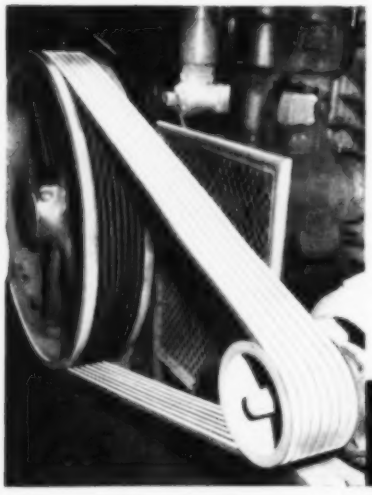
Now, bend the V-Belt built with the precisely engineered Concave Side (U. S. Patent No. 1813698)—the Gates Vulco Rope.

Gates Vulco Rope With Concave Side.

No Side Bulge. Precise Fit in Sheave-Groove.

You get the same shape change but *now* the new shape *exactly fits* the sheave-groove as shown in Figures 2 and 2-A.

Results—(1) *Uniform* side-wall wear; *longer* life. (2) *Full* sidewall grip on the pulley; carries heavier loads and sudden load increases without slippage — a big increase in drive efficiency — saving belt wear and also saving power!



The Concave Side is *MORE IMPORTANT NOW* Than Ever Before

Because the *sides* of a V-Belt are what actually *drive* the pulley, it is clear that any increased load on the belt means a heavier load that must be transmitted to the pulley *directly* through the belt's sidewalls.

Now that Gates *SPECIALIZED* Research has made available to you SUPER Vulco Ropes—carrying fully 40% higher horsepower ratings—the life-prolonging Concave Side naturally delivers greater savings today than ever before.

THE GATES RUBBER COMPANY
DENVER, U. S. A.
The World's Largest Makers of V-Belts

Gates

The Mark of SPECIALIZED Research

492

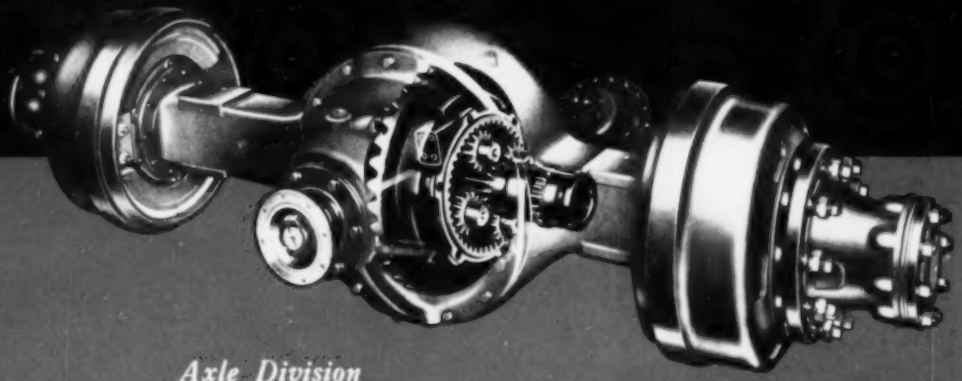
GATES VULCO ROPE DRIVES
Engineering Offices and Jobber Stocks IN ALL INDUSTRIAL CENTERS of the U. S. and 71 Foreign Countries

EATON
2-Speed Truck
AXLES

Planetary Design Reduces Gear Wear — Makes Eaton Axles Last Longer

An important factor in the long life of the Eaton Axle is its planetary design. This exclusive Eaton feature reduces stress and wear on gears and bearings, adds miles and miles of trouble-free life, holds maintenance to a minimum. * * * On trucks of the 1½-ton class and larger, Eaton 2-Speed Axles provide a balanced combination of power and speed that adds utility to the vehicle and reduces operating and upkeep costs. See your dealer for complete information.

More Than a Million Eaton 2-Speed Axles in Trucks Today



Axle Division

EATON MANUFACTURING COMPANY

CLEVELAND, OHIO

OTHER EATON PRODUCTS

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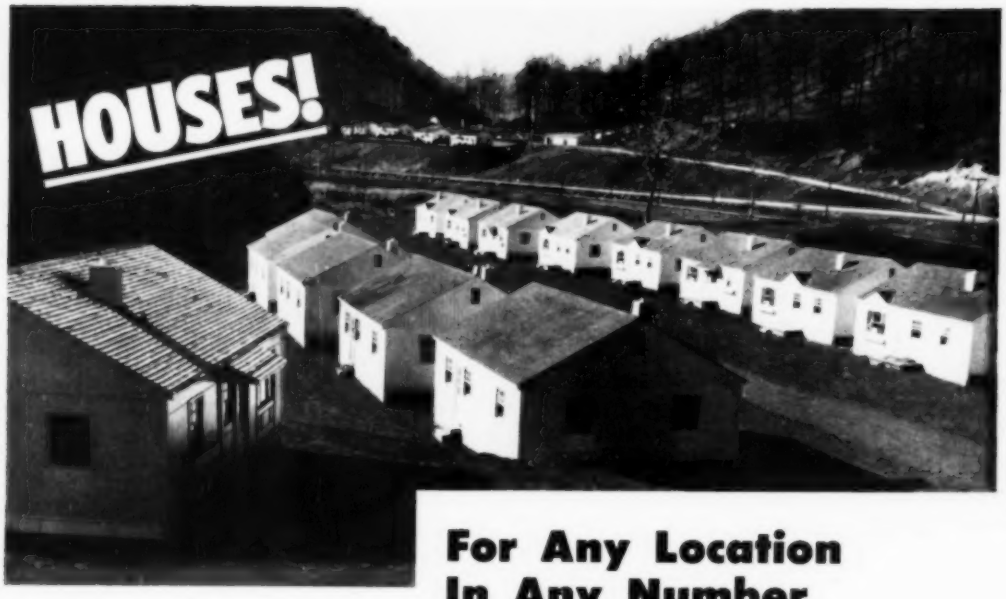


PRICE RANGE
$3,000 up

For Any Location In Any Number At the RIGHT Price

● Turn your housing problem over to NATIONAL HOMES! Inform us regarding the site, the number and sizes of houses you want, the price range desired. Field construction crews, experienced in handling projects of all sizes, will erect the houses complete and ready for occupancy. You will have a new community of attractive, well-planned, well-built homes which will attract and hold workers. NATIONAL HOMES are quality-built, have low initial and low maintenance cost. They may be moved from one location to another. Optional features such as porches, garages, type of heating, extent of plumbing and wiring, etc., give added breadth to the price range.

National HOMES

Our representative will be glad to call and give you complete information on plans and prices. Let him tell you about industrial projects completed. Investigate NATIONAL HOMES. You, too, will find them ideal for industrial housing.

NATIONAL HOMES CORPORATION • Lafayette, Indiana, U. S. A.

JOY SULMET COAL-CUTTER BIT

JOY SULMET AUGER BIT

with JOY SULMET BITS

TUNGSTEN CARBIDE-TIPPED...
with proved ability to give you

- ★ **FASTER** Cutting Speeds
- ★ **MORE** Footage with Fewer Changes
- ★ **LESS** Power used per Place Cut
- ★ **LONGER** Life in Service

LET US SHOW YOU ACTUAL PERFORMANCE RECORDS

Write for Bulletin, or *Consult a Joy Engineer*

JOY MANUFACTURING COMPANY

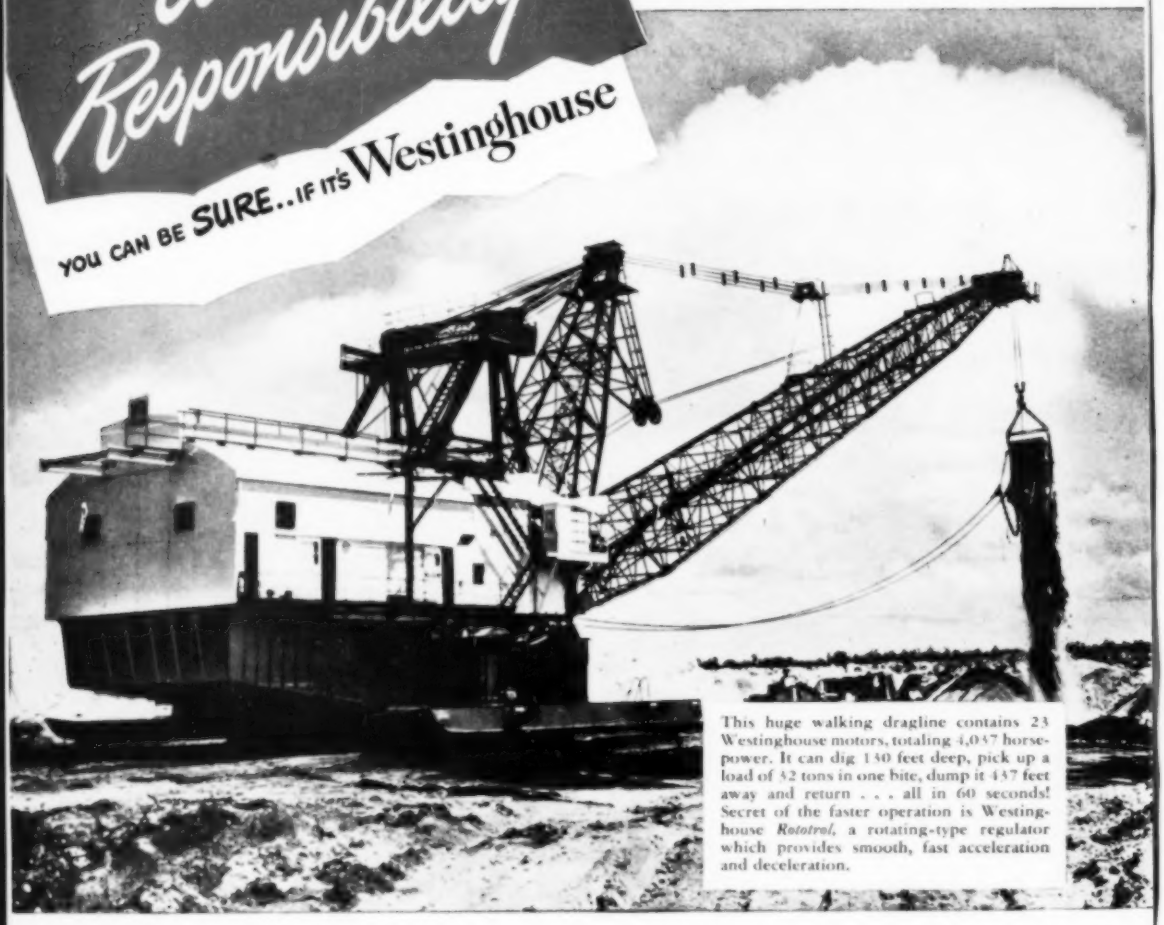
GENERAL OFFICES: HENRY W. OLIVER BUILDING · PITTSBURGH 22, PA.

IN CANADA: JOY MANUFACTURING COMPANY (CANADA) LIMITED, GALT, ONTARIO

KEY TO MORE

Unit Responsibility

YOU CAN BE SURE... IF IT'S Westinghouse



This huge walking dragline contains 23 Westinghouse motors, totaling 4,047 horsepower. It can dig 150 feet deep, pick up a load of 52 tons in one bite, dump it 437 feet away and return . . . all in 60 seconds! Secret of the faster operation is Westinghouse *Rototrol*, a rotating-type regulator which provides smooth, fast acceleration and deceleration.

Maximum continuity of service and safety to men and equipment are major items in electrical supply for strip mining equipment. In addition, the power distribution system must have a high degree of flexibility to serve shovels, draglines and other pit equipment.

The many years of "on the job" experience of Westinghouse engineers assures advanced electrical and mechanical design to meet these rigid requirements.

Westinghouse can supply *every* electrical mine requirement . . . from power production to machine drives. Planned distribution systems, ground protection, rectifiers, motor-generators, transformers, switchgear equipment, motors of all types, and Rototrol (simplest of rotating controls) . . . all are a part of Westinghouse single-source responsibility for putting power to work *productively*.

Westinghouse field engineers are always ready to survey mine requirements and make definite recommendations. Call your nearest Westinghouse office. Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pa. J-94741

PRODUCTIVE POWER

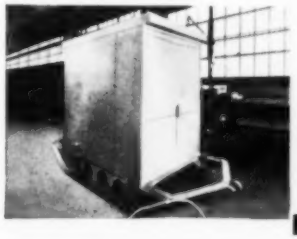
"WESTINGHOUSE-EQUIPPED THROUGHOUT" MEANS SIMPLIFIED ORDERING, QUICKER INSTALLATION, MORE EFFICIENT OPERATION

Putting power to work *productively* can be a major problem . . . or a simple one. When items must be selected, ordered and received from many sources, it means many chances for costly errors and delays . . . divided responsibility—or none at all—for performance of installed equipment.

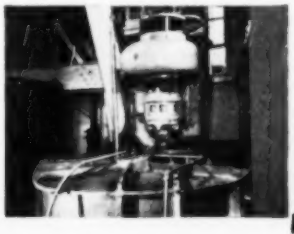
Westinghouse offers the way to simplify the job. From equipment for generation of electrical or steam power, to the most specialized types of drives, gearing and control for its utilization, Westinghouse provides a single source of supply . . . one broad pair of shoulders competent to take responsibility for performance of all parts of the job.

Here are a few of the places where Westinghouse unit responsibility prevents headaches . . . saves money . . . assures more productive power.

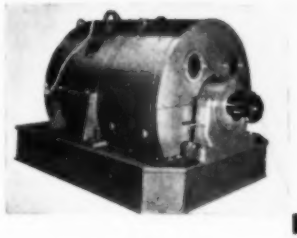
PORTABLE SWITCH HOUSES . . . materially reduce the hazards in serving pit equipment, and at the same time, speed the process of changing cables.



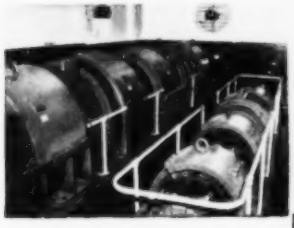
VERTICAL SWING MOTOR . . . mounted on top of gear case. One of three such motors used to rotate the cab of a 40 cu. yd. shovel.



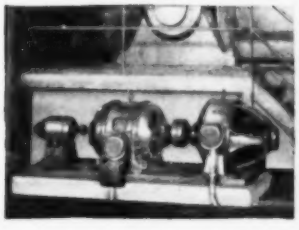
LOCOMOTIVES . . . Westinghouse builds most types of mine locomotives required for the transportation of coal, ore and supplies—above and below ground.



HOIST OR DRAG MOTION MOTOR . . . one of four such 425 hp motors used on large shovels and draglines. The outstanding feature of these motors is their low WR^2 design.



MOTOR-GENERATOR SETS . . . built especially sturdy to meet the requirements of heavy-duty mining service. The motor-generator sets, shown here, provide the power needed for shovels or draglines.



ROTOTROL . . . is a variable voltage drive control which provides preset, uniform acceleration and deceleration, maximum efficiency, maximum swing and return speed with accurate spotting of pickup and drop.

Westinghouse

PLANTS IN 25 CITIES . . . OFFICES EVERYWHERE

MORE PRODUCTIVE POWER FOR INDUSTRY

AO C1300 On-Center Metal Goggles

They're Back Again Protecting Workers Comfortably!

Again available... AO C1300 line of metal spectacle goggles provides peak protection against flying particles with the utmost in wearing ease.

SAFETY FEATURES include orbit-shaped, Super Armorplate lenses (or 6 Curve Super Armorplate lenses) scientifically hardened to resist impact... strong double-braced bridge ... close-to-face frame ... amply ventilated side shields for side protection where necessary.

COMFORT FEATURES include lightness of goggles on the nose... flexible, acetate rocking nose pads — large enough to distribute pressure over a wide area ... insulated temples which are heat resistant and perspiration proof ... a variety of goggle sizes for precise fitting of the individual worker. Your nearest MSA Representative can supply you.

Recommended Uses

Clear Lenses Without Side Shields. For frontal protection on operations such as machine and hand tool work, chemical and physical lab. work.

Clear Lenses With Side Shields. For frontal and side protection on operations such as chipping, grinding, riveting, machine work, hand tool, spot welding and bottling operations.

Calobar Lenses. When above operations also involve danger from glare, heat, ultra-violet and infra-red radiations, Calobar lenses should be worn. Also recommended for welders' helpers (under helmet), workers near welding work, railroad men, truck drivers and helpers, bus drivers and others needing protection from wind, dust, cinders, flying particles and glare.

American Optical
SAFETY PRODUCTS DIVISION

Southbridge, Massachusetts • Branches in Principal Cities

the P&H's are Teaming Up!

P&H Model 1400 (4 cu. yds.) owned by the Shen-Penn Production Company at Shenandoah, Pa.

A new P&H 1600 (6 cu. yds.) teams up at Shen-Penn in the strip mining of anthracite coal.

In one location after another owners are reordering P&H Electric Shovels to gain important new operating advantages... For example: P&H's independent propel drive. Change from dig to propel is made instantly by merely flicking the master propel switch . . . there are no mechanical complications of transferring of power from one shovel function to another . . . no sliding gears or mechanical clutches . . . no gear shifting. Faster, easier move-ups with P&H's independent propel machinery mean less trouble, less time wasted. The machine keeps in more efficient digging position . . . cuts tonnage costs. Along with Magnetorque drive, it's another important P&H *added value*.

Every third P&H Electric Shovel sold is a repeat order

P&H

ELECTRIC SHOVELS

4520 West National Ave.
Milwaukee 14, Wis.

HARNISCHFEGER CORPORATION

LEADING THE FIELD IN ELECTRIC SHOVEL DEVELOPMENTS

2 TOURNAROCKERS

"These jobs will outpull anything I ever saw."

says RALPH PRICE of NICHOLAS DEVELOPMENT CO., INC.

STRIPPING approximately 750,000 yards of blasted rock and mixed earth for Babcock Coal and Coke at Babcock State Park, Nicholas Development Company, Inc., of Beckley, West Virginia, have found Tournarockers their most effective hauling equipment.

They have been using two of these revolutionary new LeTourneau 16-ton rock buggies for the past year to haul from a 2½-yard stripping shovel.

Average load every 4 minutes, 500' haul

Tournarockers are loaded with 6 passes from the well-heaped 2½-yard dipper . . . carry 14 bank yards. Checked on 500-foot, one-way haul, each rig averaged a round trip every four minutes including load, haul, dump and return. Road is average for strip-pit operation, slight favorable grade.

So fast was the haul cycle, that one of the two big-capacity Tournarockers was under the shovel at all times. Operation of the shovel was speeded up because big target area, measuring 11'2" x 7'10", plus the low body position of the Tournarocker, saved time each swing. Six dippers to a load also made for a faster shovel operation. There was also less spill than usual. The Tournarockers moved away from shovel faster than any equipment previously used by Hawkins and Price, owners of Nicholas Development Company, Inc. These haulers were off and away the instant the last pass was completed . . . took only seconds from a standing start to get rolling fast in 3rd gear.

Faster, cleaner on dump

On the dump, these versatile off-road hauling units also showed a lot of speed advantages. They backed into position quickly — saved time by eliminating usual turning and maneuvering. Because of front wheel drive and Tournarocker design, rear wheels could be backed onto the unstable fill edge, dump-

Send for Complete Facts

To: R. G. LeTOURNEAU, Inc., PEORIA, ILL. Please send information on E16 Tournarocker.

☐ Specifications ☐ Price ☐ Delivery ☐ Would like job analysis on present operations

NAME TITLE

COMPANY TYPE OF BUSINESS

STREET CITY, STATE

Would also like information on TOURNAPULLS: ☐ 7-yard "D" ☐ 13.3-yard "C" ☐ Big 30-yard "B"

speed coal stripping at West Virginia mine

ing the load over the bank . . . practically eliminating need for dozer work on the dump.

Powerful brakes with 4,108 square inches of braking surface . . . *more on one wheel than most haulers have on the whole vehicle* . . . made this kind of handling safe. Big tires and front-wheel drive made it easy to pull back on top. Push-button steer gave quick maneuvering, and instant gear selection got the Tournarockers under way at top speed fast. The vertical dump position and wide clean lines of the body, cleared loads fast; and even when wet, no material remained in bowl.

Cuts weather delays

Ralph Price, one of the owners, and in charge of stripping operation on Sewell Mountain, says that the Tournarockers have been a big help in maintaining practically continuous operation all summer and fall in spite of rainy weather that would normally close jobs with other type haulers. "They go through where others hang up," was the way he explained it.

You, too, can profitably cut your haul costs and increase your profits with Tournarockers . . . why not get an analysis from your LeTourneau Distributor . . .NOW!

Nicholas Development Co., Inc. like TOURNAROCKERS because:

1. **BIG TARGET** and low rear-entry for dipper gives fast loading.
2. **TOURNAMATIC DIFFERENTIAL** delivers more operating days during rainy weather.
3. **SHORT TURN RADIUS** permits close approach to bank, quick spot.
4. **LOADS DUMP CLEAR** . . . Tournarockers put rear wheels safely over bank . . . pull out easily with drive wheels always on the firm footing . . . most dump clean-up is eliminated.
5. **ELECTRIC STEER**, and safe, sure control at all times, eliminate severe operator fatigue common on other haulers.
6. **GIANT TIRES**, power-proportioning differential, and power steer, materially cut weather delays.
7. **4108 SQ. IN. BRAKE SURFACE** mean sure, safe stops, better control with bigger loads.

Tournapull-Trademark Reg. U. S. Pat. Off. Tournarocker-Trademark CM.70

LETOURNEAU TOURNAROCKERS

PEORIA, ILLINOIS

HIGH SPEED on RUBBER PLUS TRACTION ADVANTAGES of a CRAWLER

CINCINNATI CUTTER BAR

Engineered and constructed for heavy duty . . . for long life . . . to withstand bending stresses. Constructed to fit all popular mining machines . . . both regular and thin kerf.

CINCINNATI DUPLEX CHAIN

WHILE production and manpower are still major problems in the coal industry, it's time to give more thought to cutting corners on operating costs. Cincinnati "Time Tested" Chains, Reversible Double-ended Bits and sturdy Cutter Bars not only help you meet heavy production schedules with a minimum of manpower, but decrease your operating costs as well. The Cincinnati Duplex Chain is so engineered to place the greatest wear and tear on inexpensive, easily replaceable parts. Heat treated and drop forged, it is designed for long wear and efficient performance. For greater tonnage, less power consumption, less maintenance and longer operating life, insist on Cincinnati Duplex Chains.

THE CINCINNATI MINE MACHINERY CO.

2983 SPRING GROVE AVENUE • CINCINNATI, OHIO

JR ROEBLING

WHEN TO SPECIFY

I.W.R.C.

(INDEPENDENT WIRE ROPE CORE)

Preformed "Blue Center" Wire Rope

PERFORMANCE-PROVEN IN MINING SERVICE

IN THE TOUGH SPOTS, rope with an Independent Wire Rope Core gives best and longest service! I.W.R.C. is outstanding where operating pressures are high; where heat resistance, additional strength, or minimum stretch are essential. But remember this . . . *the same features that make* I.W.R.C. *best for the tough spots help make it the longest-performing and most economical choice for many applications!*

In strip mining, for shovel hoist and draglines, Roebling Preformed "Blue Center" Wire Rope with I.W.R.C. is a must for small and medium size equipment, and many operators prefer it on the larger 20- to 40-yard machines. For mining machines, the same rope in Regular Lay will give you outstanding performance.

Have your Roebling Field Man help select *the right* rope for your special requirements. John A. Roebling's Sons Company, Trenton 2, New Jersey.

WRITE OR CALL THE ROEBLING FIELD MAN AT YOUR NEAREST ROEBLING OFFICE AND WAREHOUSE

Atlanta, 931 Avon Ave. ★ *Boston,* 51 Sleeper St. ★ *Chicago,* 5525 W. Roosevelt Rd. ★ *Cleveland,* 701 St. Clair Ave., N. E. ★ *Denver,* 1635 17th St. ★ *Houston,* 6216 Navigation Blvd. ★ *Los Angeles,* 216 S. Alameda St. ★ *New York,* 19 Rector St. ★ *Philadelphia,* 12 S. 12th St. ★ *Pittsburgh,* 855 W. North Ave. ★ *Portland, Ore.,* 1032 N. W. 14th Ave. ★ *San Francisco,* 1740 17th St. ★ *Seattle,* 900 First Ave.

ROEBLING

☆ A CENTURY OF CONFIDENCE ☆

MSA
SAFETY EQUIPMENT HEADQUARTERS

PROTECTION for

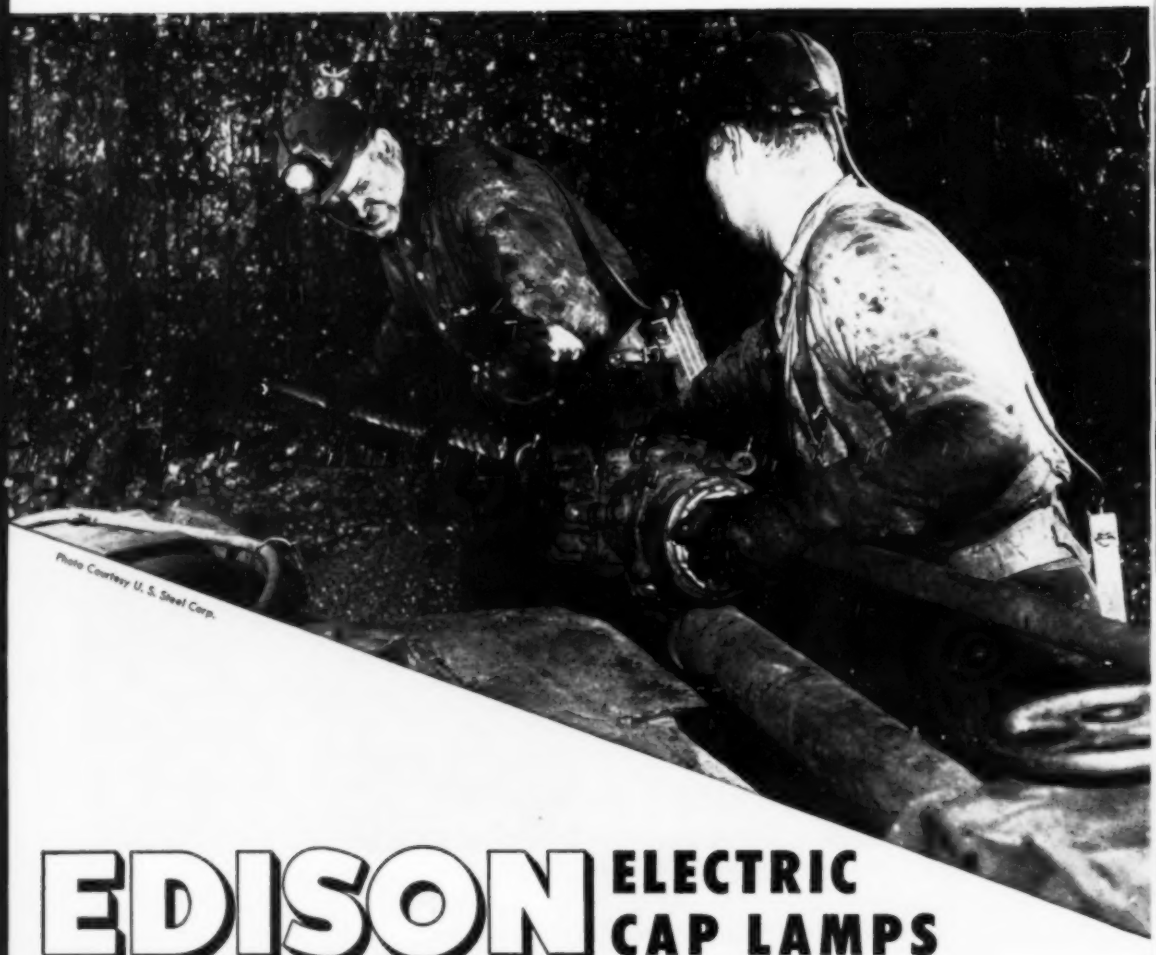


Photo Courtesy U. S. Steel Corp.

EDISON ELECTRIC CAP LAMPS

+

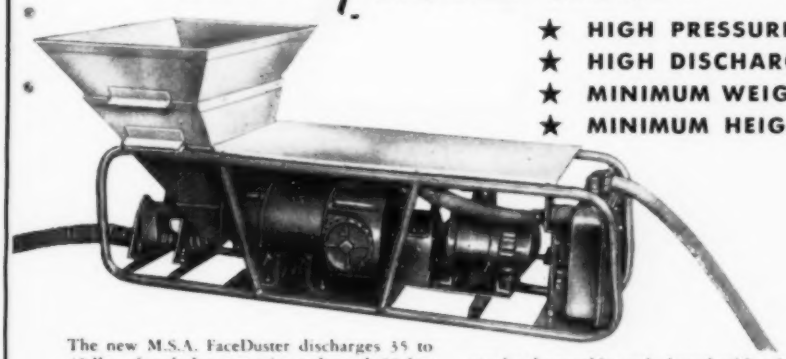
M·S·A COMFO CAPS

UNFAILING LIGHT, provided by the dependable Edison Electric Cap Lamp for the miner's every hour underground, affords a safe foundation for increased production. Years of useful life, even under extremes of service demands, are assured by the Edison Battery's unique nickel-iron-alkaline construction. • Let us arrange a demonstration of the Edison Electric Cap Lamp for you—together with its team-mate, the famous M.S.A. Comfo Cap!

MEN and PRODUCTION
everywhere in the mine!

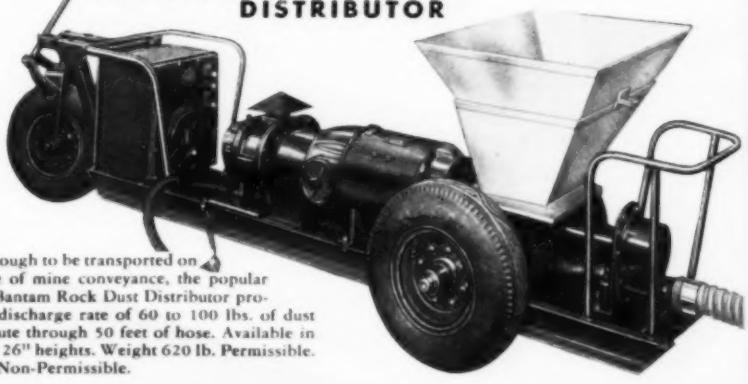
NEW! the M·S·A *FaceDuster*

★ HIGH PRESSURE
★ HIGH DISCHARGE
★ MINIMUM WEIGHT
★ MINIMUM HEIGHT



The new M.S.A. FaceDuster discharges 35 to 45 lbs. of rock dust per minute through 25 feet of 1¼" discharge hose. Permissible type weighs only 300 lbs., and the Non-Permissible only 225 lbs. This FaceDuster can be mounted on any mining machine for application of rock dust during the mining cycle. With 25' of discharge hose, a conveyor room and all breakthroughs can be thoroughly rock dusted with minimum movement of the Distributor. FaceDusters can be spotted in each working section to save transportation time and to permit immediate application of rock dust. Overall height without hopper extensions is only 15". Write for Bulletin AN-1.

the M·S·A *BANTAM* ROCK DUST DISTRIBUTOR



Light enough to be transported on any type of mine conveyance, the popular M.S.A. Bantam Rock Dust Distributor provides a discharge rate of 60 to 100 lbs. of dust per minute through 50 feet of hose. Available in 21" and 26" heights. Weight 620 lb. Permissible. 470 lb. Non-Permissible.

OTHER M·S·A ROCK DUST DISTRIBUTORS

Also in the complete M.S.A. line of Rock Dusters are track mounted machines with higher discharge rates, and small, low pressure models to meet every requirement. Write for details.

"Everything for Better Mine Safety"

All-Service Gas Masks
All-Weather First Aid Kits

Batteries, Shot Firing
Belts, Miners'

Caps, Comfo Protective
Carbon Monoxide Detectors
Chemox Apparatus

Danger Signs
Detonator Carriers
Dust Respirators

Edison Electric Cap and Trip Lamps
Explosive Containers

First Aid Materials
Flame Safety Lamps and Testing Cabinets
Foille for Burns

H-H Inhalators

Knee Pads

Methane Detectors
Mine Air Analyzers
Mine Fire Trucks

Oxygen Breathing Apparatus
Oxygen Pump

Redi-Heat Blocks
Rock Dust Distributors
Rock Dust Testing Kits

Safety Shoes
Self-Rescuers
Shot Firing Devices
Stretchers

Velocity Power Cable Splicers
Velocity Power Rail Punches
Velocity Power Drivers

(A partial list of M.S.A. Products. Descriptive bulletins will be sent on request.)

MINE SAFETY APPLIANCES COMPANY
BRADDOCK, THOMAS AND MEADE STREETS . . . . . PITTSBURGH 8, PA.
At Your Service: 48 BRANCH OFFICES in the UNITED STATES
MINE SAFETY APPLIANCES CO. OF CANADA LIMITED · Toronto, Montreal, Calgary, Winnipeg, Vancouver, New Glasgow, N. S.
MINE SAFETY APPLIANCES CO. (S.A.) (PTY.) LTD. · Johannesburg, South Africa; N'Dola, No. Rhodesia; Bulawayo, So. Rhodesia
Representatives in Principal Cities in Mexico, Central and South America CABLE ADDRESS, "MINSAF" PITTSBURGH

Everything in piping for mines ...on one order to CRANE

DRAINAGE LINES *in a metal mine featuring Crane valves and fittings. For dependable control . . . for complete selection . . . standardize on Crane.*

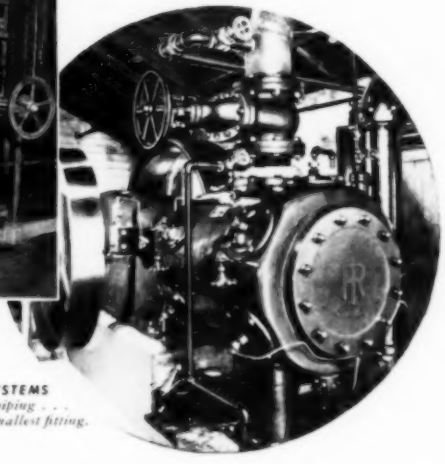
—and that includes all valves, fittings, pipe and pipe line accessories—for power, process or general service mine installations. One order . . . from one catalog . . . brings you the world's most complete selection of piping equipment, in brass, iron, steel and alloy materials. Crane Branches, strategically located for your convenience, are well stocked to supply your needs.

Many leading mines know the satisfaction and economy of standardizing on Crane. For the unequalled completeness of this **Single Source of Supply** simplifies every piping procedure, from design to erection to maintenance. You get better installations . . . avoid needless delays, when you put **Complete Responsibility** on Crane for materials. And for **High Quality** that makes for dependable piping performance, get Crane Quality, unsurpassed for more than 90 years.

CRANE CO., *General Offices:* 836 S. Michigan Ave., Chicago 5, Ill. *Branches and Wholesalers Serving All Industrial Areas.*

ONE . . . SOURCE OF SUPPLY
. . . RESPONSIBILITY
. . . STANDARD OF QUALITY

BREAKER PLANT *at a large coal mine. Crane equipment includes iron valves in piping to secondary cone, agitator ring and classifier.*



FOR AIR COMPRESSOR SYSTEMS
Crane supplies everything in piping . . . from the largest valve to the smallest fitting.

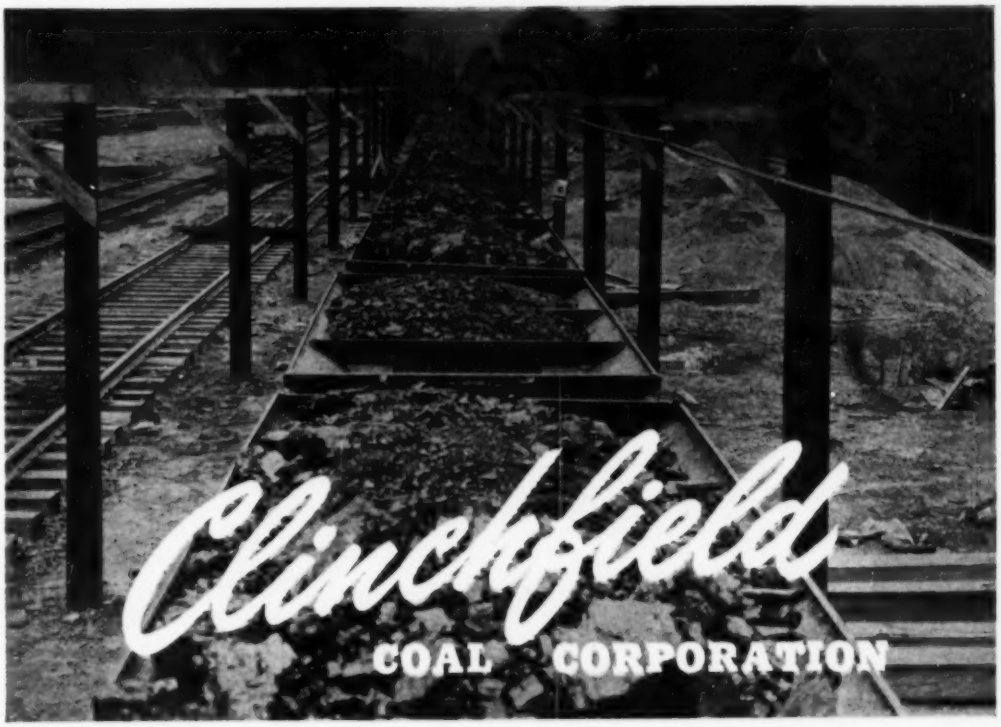
EVERYTHING FROM . . .

VALVES
FITTINGS
PIPE

CRANE

PLUMBING
AND
HEATING

FOR EVERY PIPING SYSTEM



...pins its faith to C.C.F DROP BOTTOM MINE CARS for coal transportation efficiency at the new MOSS and MEADE mines

Opened in June 1947, the Moss Mine located in Dickenson County, Va., is served by the Clinchfield Railroad. Mobile mining units load into large C.C.F Drop Bottom Mine Cars of standard automatic-trip design. Present capacity of this mine is 10,000 tons per day.

The MEADE Mine, located in Wise County, Va., was opened a year later, in June 1948. This mine is still in active development. Mine is served by the Chesapeake and Ohio Railway. When full scale operation is attained an average daily output of 8000 tons is anticipated. The mining schedule calls for loading by mobile units into C.C.F Drop Bottom Cars.

C.C.F Mine Cars of this latest Drop Bottom Type will lower your cost by SAVING DUMPING TIME. Their use results in (1) more trips per shift, (2) an increase in the efficiency of your loaders, and (3) INCREASED PRODUCTION.

Our sales representatives will be glad to discuss the merits of Drop Bottom Mine Cars with you.

AMERICAN CAR AND FOUNDRY COMPANY

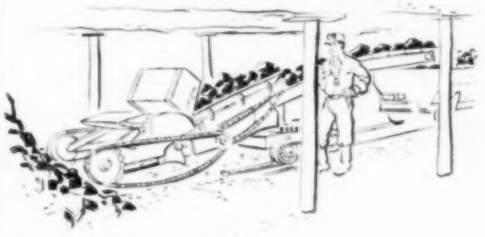
NEW YORK • CHICAGO • CLEVELAND • WASHINGTON • ST. LOUIS
PHILADELPHIA • HUNTINGTON, W. VA. • BERWICK, PA. • PITTSBURGH • SAN FRANCISCO

Coal Facts #1.. ..A ONE MINUTE *QUIZ*...FOR MEN IN THE COAL INDUSTRY

1. When was COAL first put to use by a civilized people?

2. When was the first seam of COAL discovered in America?

3. When was the first commercial COAL Mine started in America?



4. When was the world's first successful COAL loading machine made?

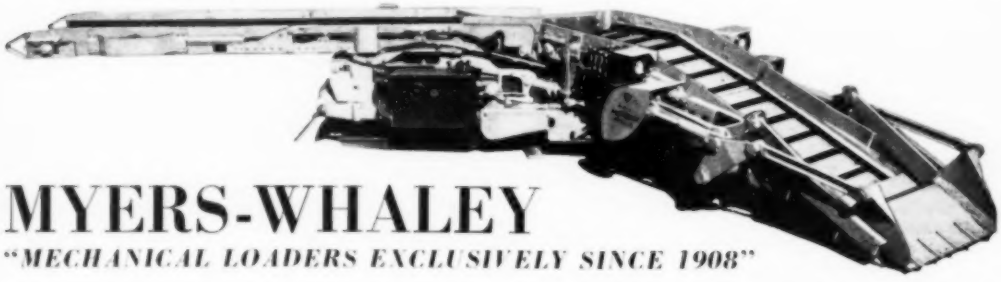
Answers:

1. The earliest written record places the time at 300 B.C. (2249 years ago) when ancient Greek Smiths burned "black stones" called "anthraces" according to the writings of the Greek Philosopher Theophrastus.

2. In 1673 the French explorers Joliet and Marquette found a large outcropping of coal near the site of Utica, Illinois. This was the first discovery of coal in North America by white men.

3. In 1750 a mine was opened on the James River near Richmond, Va. This mine used slave labor and was a success from the outset. The original bed still produces a high quality bituminous coal.

4. In 1908 the quest for a commercially successful loading machine was completed when Myers-Whaley produced their first "shoveling machine." While this original "shoveling machine" was no match for comparison with the sleek, modern-day Whaley "Automat," its shovel-action principle was sound enough to revolutionize the coal mining industry. Today, the Whaley "Automat," thanks to its dependable action, is still a leader in its field, delivering big coal capacity . . . safely . . . swiftly . . . smoothly . . . at amazing savings in power and maintenance. It is versatile too . . . does development work, cleans up falls, and handles coal, rock or slate with equal efficiency. Myers-Whaley, Knoxville 6, Tennessee.



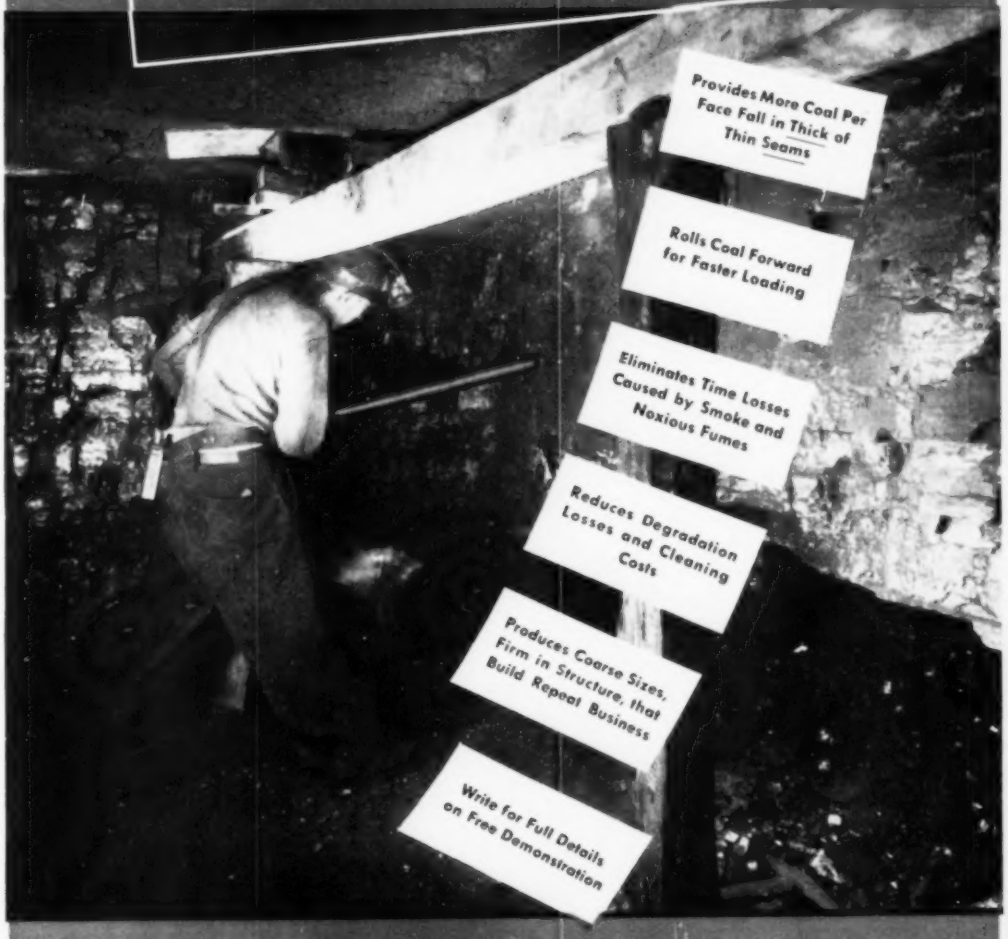
MYERS-WHALEY

"MECHANICAL LOADERS EXCLUSIVELY SINCE 1908"

CARDOX

"THE NON-EXPLOSIVE MINING METHOD"

and CARDOX HARDSOCG Drilling Equipment


Provides More Coal Per Face Foll in Thick of Thin Seams
Rolls Coal Forward for Faster Loading
Eliminates Time Losses Caused by Smoke and Noxious Fumes
Reduces Degradation Losses and Cleaning Costs
Produces Coarse Sizes, Firm in Structure, that Build Repeat Business
Write for Full Details on Free Demonstration

CARDOX CORPORATION • BELL BUILDING • CHICAGO 1, ILLINOIS

YOUR MONEY'S WORTH

A product carefully made, one that gives you a dollar's worth for every dollar you spend, is a real buy any day . . . any year.

You're getting such a buy, every time you order Bethlehem wheels. Mileage is packed into them . . . but something more important, too. Call it the ability to do a tougher job than you'll ever ask them to handle.

Bethlehem wrought-steel wheels for urban lines are made in the same careful manner as their counterparts for steam and diesel trains. Forging and rolling are the same; machining is done with the same expert touch; inspection is as thorough.

When it's time to purchase wheels for subways, elevated systems, or street railways, keep Bethlehem very much in mind. By writing Bethlehem into your specifications, you are ordering as fine a wheel as can be found anywhere. Your money's worth, to the last penny.

★ BETHLEHEM STEEL ★

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation
Export Distributor: Bethlehem Steel Export Corporation

BETHLEHEM WROUGHT-STEEL WHEELS and FORGED-STEEL AXLES

JOY CHAIN CONVEYORS

Built to give you real service!

In every anthracite and bituminous mining field, JOY Chain Conveyors have proved and re-proved their superior efficiency and ability to move tonnage steadily and dependably under the most severe working conditions. The JOY line includes a complete variety of models to meet any requirement you may have in room, face or entry work. All types are relatively low in height, compact and rugged. They employ the finest materials—including special alloy steels at strategic points—to provide maximum strength for long life, with minimum weight for easy handling. ● Wherever you use conveyors—chain, belt or shaker—use JOY equipment for *best* results.

Write for Bulletin, or

Consult a Joy Engineer

W&D CL2346

JOY MANUFACTURING COMPANY

GENERAL OFFICES: HENRY W. OLIVER BUILDING · PITTSBURGH 22, PA.

IN CANADA: JOY MANUFACTURING COMPANY (CANADA) LIMITED, GALT, ONTARIO

C&O does it again!

C & O's Presque Isle Leads All Other Docks in the Handling of Lake Coal During 1948

Again in 1948 C & O's Presque Isle dock was the leader in the dumping of lake coal tonnage. The 15,600,000 tons of coal dumped at C & O's Presque Isle facilities was more than that handled over any other dock on the Great Lakes.

Chesapeake and Ohio's constant expansion and improvement program is the answer. New tracks and other improved facilities have been installed at Presque Isle. At Walbridge Yard, which services Presque Isle, the major part of an improvement program costing millions of dollars, was completed in 1948. The modern car retarders have increased the capacity of this yard and provide quicker and gentler handling of lake cargoes. In addition, there are new buildings, pneumatic tube systems, public address equipment for the direction of yard workmen, and two-way radio communication systems in locomotives for use by yard masters in directing engine crews.

Chesapeake and Ohio's improvements for the handling of lake coal extend back for hundreds of miles—long before the coal reaches Presque Isle. New tracks, modern handling equipment, and extensive hump and yard improvements have been made at C & O's Parsons Yard at Columbus and the huge Russell Yard at Russell, Ky.

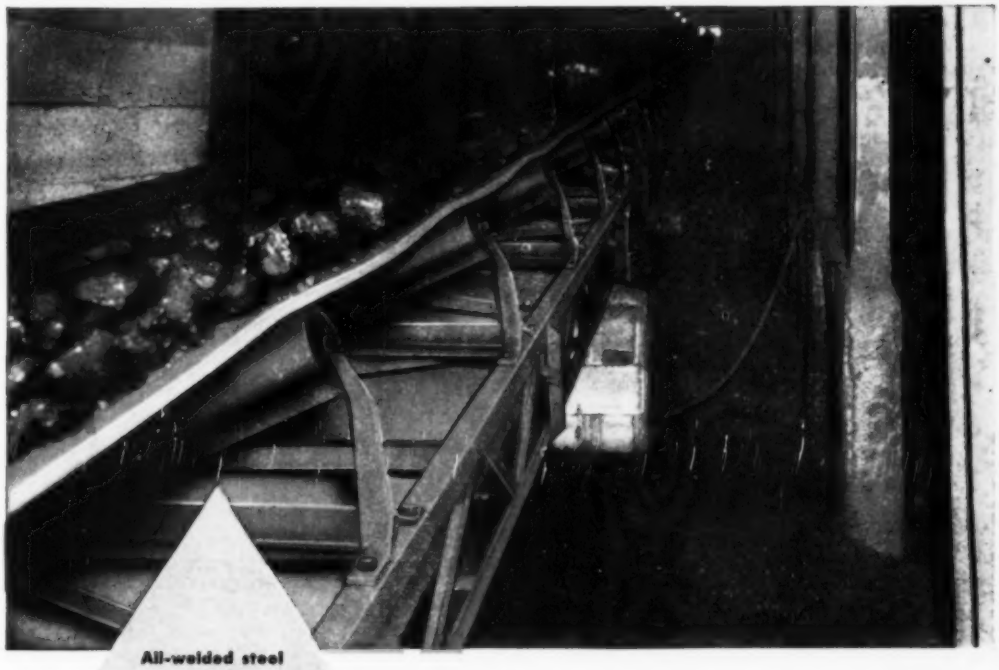
All of this adds up to speedy movement and efficient handling of lake coal at C & O's Presque Isle facilities. C & O is first because it has the finest coal handling facilities – and by maintaining its policy of constant growth and improvement, C & O continues an aggressive partner of the great coal industry.

C AND O

CHESAPEAKE & OHIO RAILWAY

Largest Originating Carrier of Bituminous Coal in the World

Barber-Greene



All-welded steel Belt Carriers

Available in roller, ball or plain bearings
"Four-pass" grease seal protects bearings

EASY TO CHOOSE . . . EASIER TO USE! BELT CONVEYORS!

Barber-Greene "pre-engineering" simplifies your selection of the right, most economical belt conveyor set-up for your jobs. Standardized units—carriers, frames, take-ups, drives—are factory aligned, interchangeable. You can easily choose the units you need to make up a complete conveyor that's especially fitted to your material-moving problem. And, when they're delivered on the job, you'll find them plainly marked for quick installation with a minimum of "blueprint" work or on-the-spot fabrication. To gain these two big advantages—that have saved money for hundreds of Barber-Greene users—see your Barber-Greene distributor.

BARBER-GREENE COMPANY · AURORA, ILLINOIS

Constant Flow Equipment

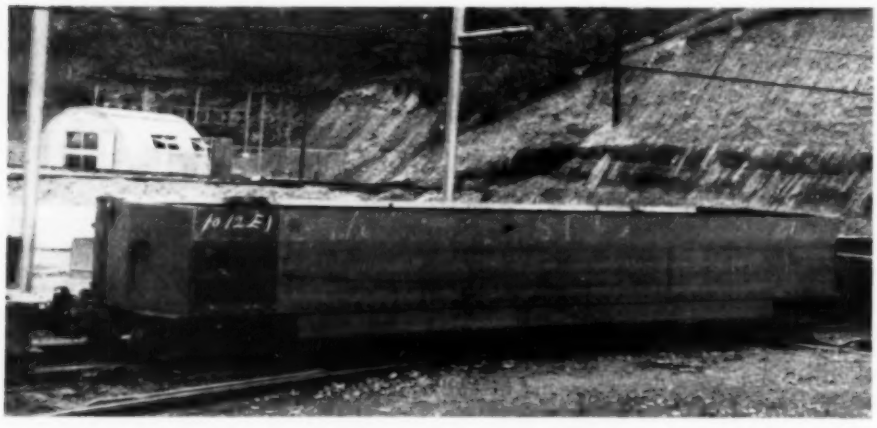
LOADERS · PERMANENT CONVEYORS · PORTABLE CONVEYORS · COAL MACHINES · BITUMINOUS PLANTS · FINISHERS · DITCHERS

4-Car Train above transports 100 tons of mine refuse up 10% grade at 10 m.p.m. Elevation is gained rapidly and dumping space conserved. Automatic dumping of either side and over the end makes the dump with least labor.

Differential Larry shown above dumps three ways. Automatic dumping controlled from operator's cab. Extends the dump laterally and longitudinally at the same time gaining elevation at the desired rate. End door in dumping position acts to extend dump by plowing material over the end of the dump and to raise track by plowing material into it.

DIFFERENTIAL REFUSE DISPOSAL EQUIPMENT

Differential has standard equipment for every refuse disposal problem. All equipment—whether 10 tons, or 1,000 tons per hour—is sturdy, rugged and simple. On very steep grades Differential equipment performs in an outstanding manner. Builds and maintains the dump with the least labor cost. Send for Bulletin D-50.



DIFFERENTIAL MINE CARS

Differential mine cars feature largest capacity within given dimensions. Results in fewer cars, maximum output per loading unit, and least maintenance cost. Differential cars travel at high speeds with safety—negotiate sharp curves easily. Construction is simple and rugged. Send for Bulletin D-53.

DIFFERENTIAL STEEL CAR COMPANY

FINDLAY, OHIO, U. S. A.

Builders of Haulage Equipment Since 1915

AIR DUMP CARS · MINE CARS · MINE LOCOMOTIVES · ROCK LARRIES · DUMPING DEVICES
BURDEN-BEARING LOCOMOTIVES · STOCKPILING CARS · COMPLETE HAULAGE SYSTEMS

One of three "Caterpillar" D13000 Engines belted to one generator at the Fort Hartford Coal Company's mine.

HONEST "ENJUNS"

"THESE ENGINES never need watching," says Supt. Jesse Tanner, of the Fort Hartford (Kentucky) Coal Company. "They go along without interruption day after day."

When you realize that his statement was made about four "Caterpillar" Diesels that have been working at the Fort Hartford Mine for years, it becomes especially significant. One unit, in fact, is so old that it even antedates "Caterpillar's" use of hour meters. Nobody actually knows its operating record – though it must well exceed the 29,761 hours its next-oldest mate had rolled up at the date of these photographs. The next had 13,717 hours, while the fourth – a mere youngster – had 6505.

The mine is all-electric operated – the four "Cat" engines powering generators that drive drills, mining machines, hauling motors, fans, pumps, tipple, crusher, lights, and miscellaneous motors. Maintenance has been extremely light . . . because they're *honest engines* – sturdy, efficient, dependable, long-lived–as you can be sure *any* "Caterpillar" products *you* buy will be.

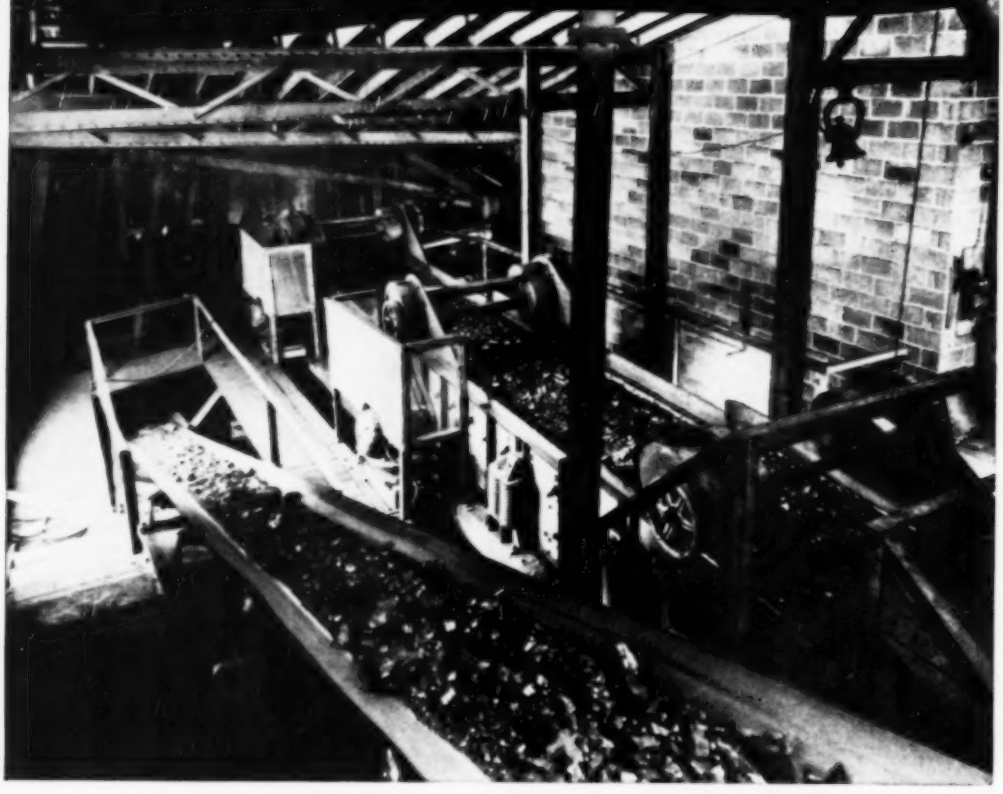
CATERPILLAR TRACTOR CO. • PEORIA, ILLINOIS

CATERPILLAR
REG. U. S. PAT. OFF.

DIESEL ENGINES • TRACTORS
MOTOR GRADERS
EARTHMOVING EQUIPMENT

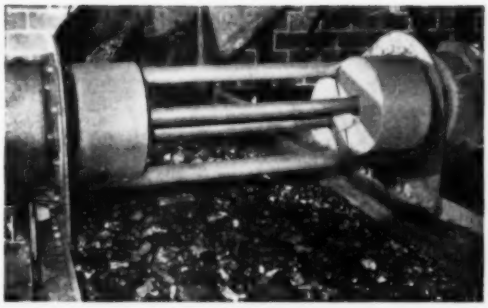
How a mechanized tipple turns out cleaner, more uniform coal

HEWITT-ROBINS COAL-HANDLING SYSTEM ENABLES LECKIE SMOKELESS COAL COMPANY TO KEEP COAL PROCESSING IN PERFECT STEP WITH HIGH PRODUCTION



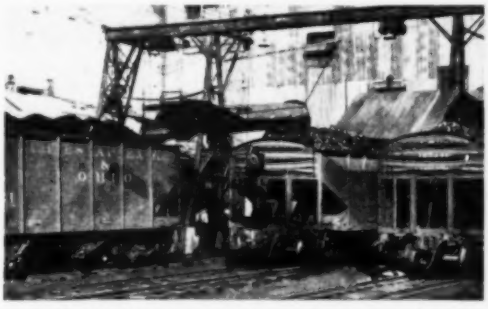
At the rate of 2,500 tons per day. The Leckie Smokeless Coal Company benefits by modern belt conveyors from start to finish in its Anjean, W. Va., operation. A Hewitt-Robins Mine Conveyor moves coal out of the mine quickly and economically. The Hewitt-Robins Conveyor shown here carries coal up to the pre-sizing screen ahead of the washing equipment.

HEWITT-ROBINS COMPLETE COAL-HANDLING SYSTEMS

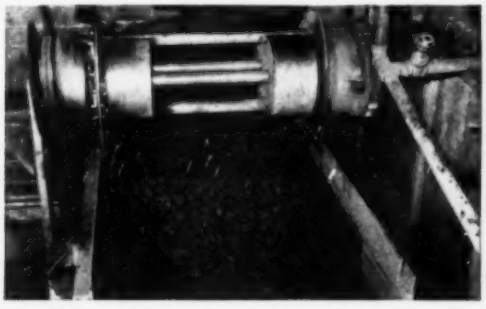


Dry fines removed here. Incoming coal is discharged by conveyor onto this Hewitt-Robins Eliptex Screen. Fines of ⅛" or less are shaken out and quickly moved by conveyor to waiting railroad cars.

Automatically washed and dried. Coal larger than ⅛" passes to a mechanical washer for thorough cleaning. Then this battery of Hewitt-Robins Eliptex Dewaterizers shakes out virtually all moisture.



Sized coal conveyed to cars. The dewatered coal is mechanically separated by size and is loaded—according to size—by Hewitt-Robins Boom Conveyor into railroad cars.



Valuable fines recovered from sludge. Meanwhile, another Hewitt-Robins Eliptex Dewaterizer recovers valuable coal particles from the sludge. It saves thousands of tons of these fines each year!

You can find your answer here, too!

Whatever your coal-handling problem, you can get the answer from Hewitt-Robins.

Through their use of modern Hewitt-Robins coal-handling equipment, hundreds of operators are marketing cleaner, more uniform coal. Furthermore, they are handling that coal swiftly, surely and economically.

Here's just one example of how Hewitt-Robins stands ready to serve you. Three types of Hewitt-Robins Mine Conveyors—machinery and belt—are now carried *in stock* in 26", 30" and 36" widths so you can take *immediate delivery* from Charleston, W. Va., or Passaic, N. J.

Whether you need a single vibrating screen, a mine conveyor or a complete coal-handling system, depend on Hewitt-Robins.

THESE DIVISIONS OF HEWITT-ROBINS SERVE THE COAL INDUSTRY

Hewitt Rubber Division

Through the manufacture of water hose, air hose, water suction hose, and coal conveyor belting.

Robins Conveyors Division

Through the manufacture of conveyors, idlers, vibrating screens, cloth, dewaterizers, and car shakeouts.

Robins Engineers

By designing, furnishing and installing complete coal-handling systems.

HEWITT ROBINS INCORPORATED

RUBBER DIVISION, BUFFALO 5, NEW YORK
CONVEYORS DIVISION, PASSAIC, NEW JERSEY
ENGINEERS, NEW YORK CITY 7, NEW YORK

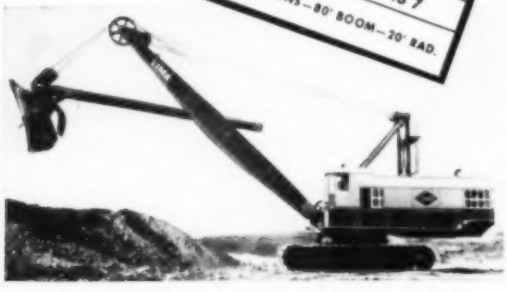
Introducing the

LIMA Type 2400

a BIG New Machine for BIG JOBS!

Capacities

SHOVEL	DIPPER	BOOM	HANDLE
	6 5½ 4½	40'-0" 52'-0" 67'-0"	30'-0" 40'-0" 50'-0"
DRAGLINE	BOOMS	100' to 150'	
CRANE	BUCKETS CU. YDS.	5 to 7	
	110 TONS—80' BOOM—20' RAD.		



The LIMA line includes Shovels ¾ to 6 yards, Cranes 13 to 110 tons, and Draglines variable. Write for complete information.

Here is the latest (and largest) member of the LIMA family of excavators, a shovel, crane or dragline engineered and constructed for extra heavy duty. Features include: "precision" air control of all travel and operating motions; anti-friction bearings at all vital bearing points including the drums, cone rollers and hook rollers; large grooved, tapered drum for shovel operation; extra large, grooved drums for dragline work; truck base and rotating base are of heavy one-piece annealed cast steel; extra sturdy construction throughout; easy accessibility of all parts requiring lubrication and maintenance; Hamilton Diesel power plant, and many other features for maximum performance and availability.

It will pay you to consult your nearest LIMA Sales Office or representative before you buy your next shovel, crane or dragline. Offices in principal U. S. cities.

Lima Shovel and Crane Division

LIMA, OHIO

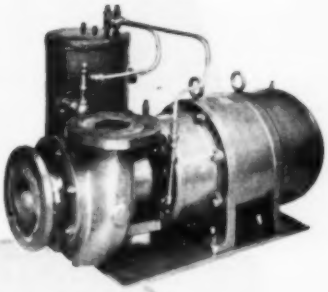
OTHER DIVISIONS: *Lima Locomotive Works Division; Niles Tool Works Co.; Hooven, Owens, Rentschler Co.*

LIMA HAMILTON CORPORATION

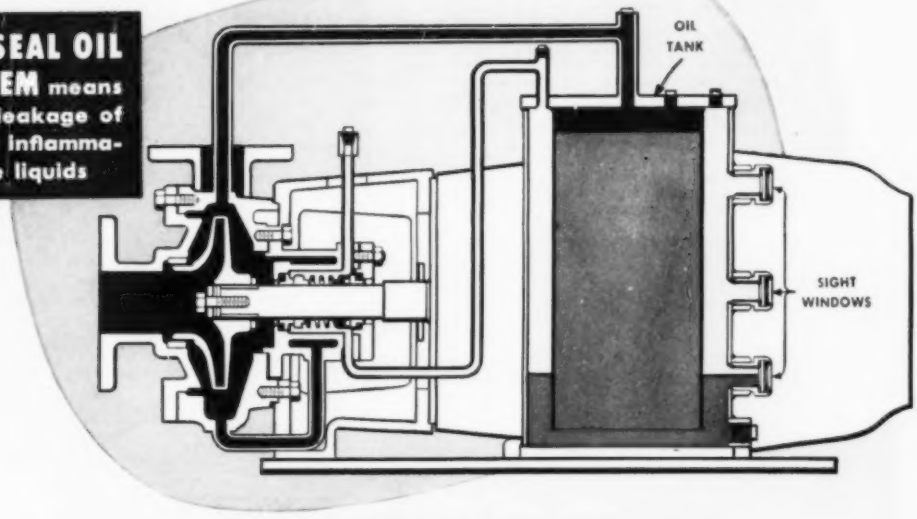
BJ *Type* TLB *Bulk Station Pump*

A centrifugal pump designed especially for pumping gasoline, butane, propane, kerosene, stove oil, lubricating oils, diesel fuel, paint thinner and other hydrocarbons.

The TLB is a single suction, single stage centrifugal pump of the BJ Bilton type (pump close-coupled to an induction motor with a single shaft common to both). A double mechanical seal, contained in an oil-filled, liquid-cooled seal chamber, replaces the conventional stuffingbox. And a special two-compartment oil tank connects pump discharge to seal chamber in such a way that seal chamber is filled with oil at discharge pressure but the oil is isolated from pumped liquid. Original filling of oil will last a year or more.



The SEAL OIL SYSTEM means —no leakage of costly inflammable liquids



PUMPED LIQUID

ISOLATING LIQUID (usually water)

OIL

THE UNIQUE SEAL ARRANGEMENT HAS SEVERAL ADVANTAGES

The success of the double mechanical seal and the seal oil system lies in the fact that oil pressure in seal chamber is always slightly higher than pressure at entrance to inner seal . . . because of the pumping action of impeller shroud and hub.

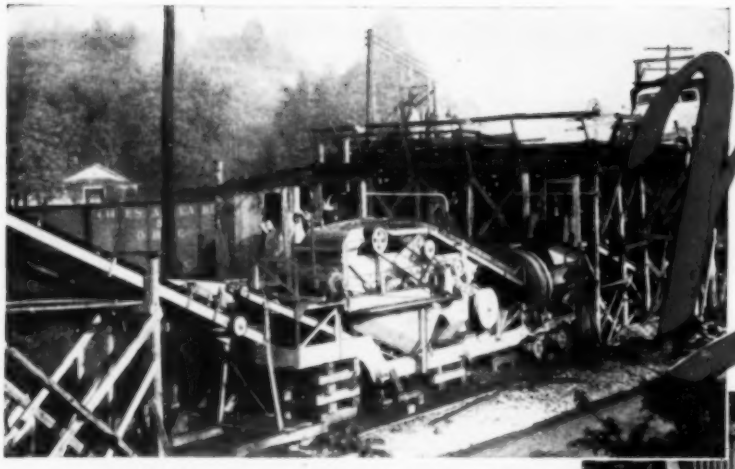
1. NO LEAKAGE of costly, inflammable liquids through seal chamber.
2. GOOD LUBRICATION of ground seal faces is maintained by leakage of lubricating oil from seal chamber even though pump loses suction. This leakage is so minute that no trace can be found in the pumped liquid.
3. NO CORROSION of seal parts regardless of liquid pumped.

Byron Jackson Co.

LOS ANGELES 54, CALIFORNIA

Offices in Principal Cities

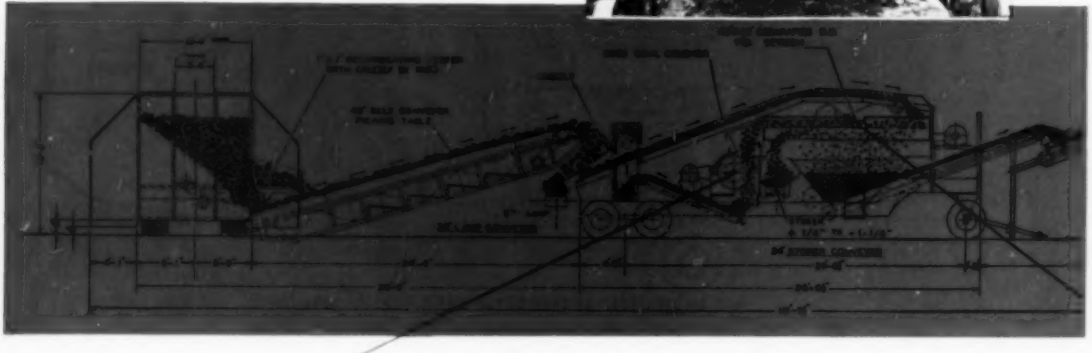
now

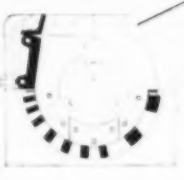


New Cedarapids portable coal tipple (above) at a Kentucky mine. Note truck ramp which permits trucks to drive up on one side, dump and drive off the other side, eliminating back-up delays.

Charging hopper, feeder and picking table (right) of Cedarapids portable tipple used at Indiana mine. Picking belt runs slowly and is equipped with a walkway on each side, accommodating a total of 8 refuse pickers.

This completely balanced preparation plant includes a portable crushing and screening unit with a heavy-duty coal crusher and horizontal vibrating screen; 48" or 60" wide rubber belt picking table; 10 ton, 10' x 12' steel charging hopper, with ramp retaining walls and truck ramp over the top if desired. Capacities range from 75 to 100 tons per hour of stoker coal and carbon, the top size passing a 1" screen. A screen analysis of coal crushed shows approximately 15 to 25% passing the $\frac{1}{4}$" square opening, when the crusher is set to produce 1" stoker coal, running from 5 to 10% oversize . . . a considerably lower percentage of minus $\frac{1}{4}$" coal than is produced by most other types of coal crushers. Production of dust is reduced to the minimum.





Cedarapids Heavy Duty Coal Crusher, designed specifically for coal crushing, produces desired sizes without an excess of dust. Built to withstand hard usage and shock of tramp iron, this coal crusher gives extra insurance against costly shutdowns for repairs.

HERE'S HOW IT WORKS . . .

Mine-run coal is dumped into charging hopper and fed onto conveyor belt which also serves as picking table. Grizzly plate feeder in the hopper allows fine material to drop onto picking belt first, so that larger sizes can be fed in a smooth, workable flow on top of them for easy picking. Picking belt carries coal to grizzly on the crushing and screening unit where lump coal falls off onto lump conveyor. The remaining coal drops onto double-deck, horizontal vibrating screen. Minus $\frac{1}{4}$" carbon falls through both decks and is taken out by slack conveyor. Stoker sizes fall through top deck to second deck, which feeds the coal to stoker conveyor. All coal retained on the top deck is fed to coal crusher where it is reduced and conveyed by return wheel to the plant conveyor and screen for final sizing.

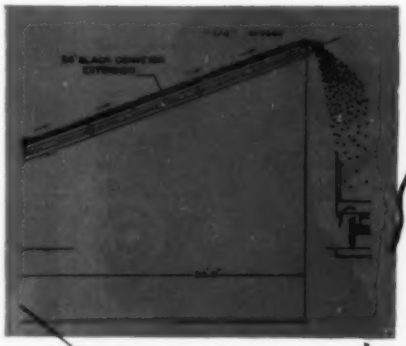
. . . . for the first time
A SMALL MINES COAL TIPPLE
"All-In-One-Package"!

HERE'S a *brand new* development in coal preparation plants . . . standard Cedarapids units combined in a complete *packaged* coal tipple, designed to put the small mine in the big-time profit bracket. It's a LOW COST plant that cuts you in on today's premium prices for prepared coal.

This engineered package crushes and grades three or more sizes of coal in one smooth operation. It is extremely flexible as to feeding, picking and delivery into bins, storage pits or gondolas. You can feed it with truck, conveyor or any method most convenient . . . set it up on skids and later convert it into a complete portable unit on tires. Suitable washing equipment can be added where necessary.

While electrical operation is preferred by some users, any type of power can be used. Maintenance costs are low and the few wearing parts can be quickly and easily replaced. Cedarapids, long experienced in producing highly efficient crushers and screens for coal and construction industries, maintains a nation-wide service organization, established for more than twenty years, to provide a ready source of supply for parts and "at-your-elbow" service.

Don't try to sell mine-run coal at a sacrifice when you can easily supply buyers with a gradation of coal superior to most on the market. Your investment in this type of machinery per ton of finished coal is extremely low, making it possible to work mines that may now be considered unprofitable. Get your share of the profits NOW! Write for full details, specifications and prices.

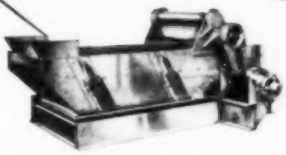


OTHER CEDARAPIDS PRODUCTS FOR COAL PROCESSING

In addition to the "all-in-one-package" coal plant, Cedarapids also offer a complete line of high capacity, job-proven units to meet your particular needs . . . 3 sizes of Cedarapids Coal Crushers, with long life SKF bearings, sturdy over-all design and low power requirements . . . HORIZONTAL Vibrating Screens, furnished in single and double deck styles in a wide range of widths, lengths and sizes; require minimum headroom and assure fast, accurate grading . . . a complete line of belt conveyors with life-sealed bearings can be assembled for any desired length; available in portable or stationary models for surface or underground installations.

Cedarapids Mine Conveyor

Whatever your coal processing requirements, whether a complete plant or individual units, buy the best . . . buy Cedarapids. Write for literature for full information.



Double-deck vibrating screens operate in flat or horizontal position, requiring low head room. Give greater efficiency and screening capacity than other types of screens, and assure accurate sizing, closer gradation and no carry-over of fine materials.

Cedarapids

Built by IOWA

IOWA MANUFACTURING COMPANY

Cedar Rapids, Iowa, U. S. A.

There's a Macwhyte Rope that's the right rope for your equipment

All job-proved—a thousand and one wire ropes to choose from

For easy handling and longer service use PREformed Whyte Strand—it's internally lubricated.

Ask a Macwhyte representative to recommend the rope best suited for your equipment.

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WILMOT STOCKS *More* CHAIN SIZES *and Types of Attachments*

Designed and originated by Wilmot, "Keystone Rivetless" chain has been serving American industry for over 40 years. This widely-recognized, heavy-duty chain is used in many types and makes of elevators and conveyors. To supply the needs of both the builders and users of such equipment, we manufacture the widest selection of chain sizes available.

Pictured above is a section of our chain house. Here we endeavor to stock, for prompt shipment, all specified sizes, in pitches from 3" to 10½" and in working loads from 3,000 to 128,000 lbs. Also a wide choice of materials: drop forged steel--high carbon, normalized, heat-treated; and alloy steels.

We also manufacture and stock the largest selection of attachments, for every purpose.

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Full engineering data for designers or maintainers of hauls, conveyors or elevators. Abundantly illustrated.

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Wilmot Coal Preparation Equipment: Hydrotators • Hydrotator-Classifiers • Hydro-Separators • Simplex Jigs Crushing Rolls • Sizing Shakers • Bucket Elevators • Conveyors • Car Hauls • Keystone Rivetless Chain, etc.

WILMOT BUILDS BETTER BREAKERS

No Clean-up HERE...

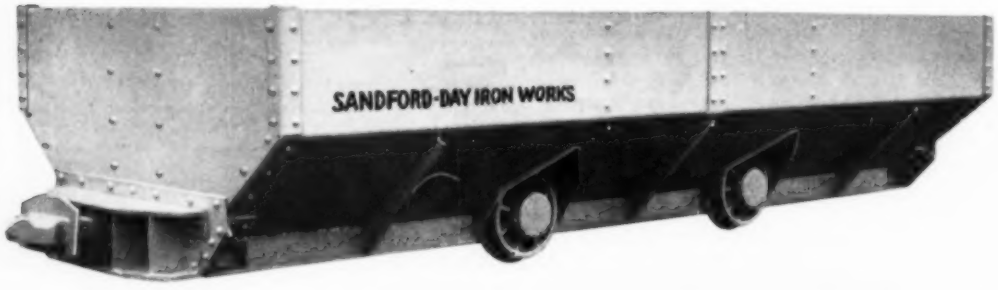
THE SANFORD-DAY *Completely Sealed* "AUTOMATIC"

The "COMPLETELY SEALED" feature now being built into every S-D "Automatic" drop bottom car is money saving news to mine operators who have been looking forward to the day of dust-free tracks. Coal dust accumulation is expensive. Some mines have been spending over $10,000 annually on track clean-up alone. What is it costing you? The S-D "Sealed Automatic" completely eliminates this expense because it is dust sealed both at wheel hoods and at the necessary clearance space between the doors and the frame. The coal dust can't dribble out and accumulate on the track . . . it stays in the car until it is dumped in the bin with the coal. This patented Sanford-Day feature is another step in maintaining Sanford-Day leadership in saving money for mine operators. You still get the same big capacity and automatic unloading. You get our improved long-life construction and our foolproof "Jerk-Out" unlatching device, that operates beneath the car. Now, with this revolutionary "COMPLETELY SEALED" construction . . . you get the greatest money saving car the industry has ever known.

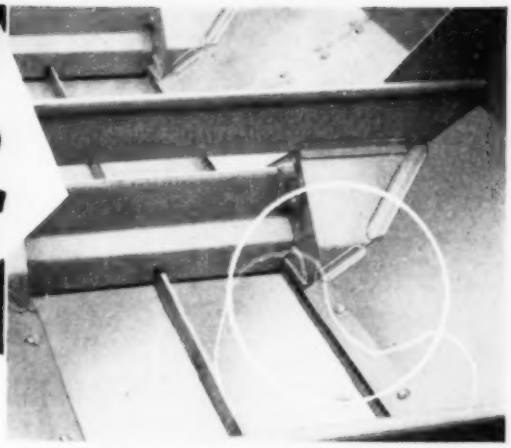
The S-D "Automatic", shown above and below, has our foolproof "Jerk-Out" unlatching device that operates underneath the car. It has two latch hooks for safe and foolproof operation, and all unlatching mechanism on end of car is eliminated.

No other car can offer you the advantages of S-D "Automatics" for efficient service, maximum production and low cost per ton of coal handled.

Did you know that, whatever your method of mining, it isn't new or peculiar to our "Automatics"? Regardless of the type of mine, there are S-D "Automatics" working under the same conditions elsewhere, and our company can show you these installations. So, if you have a special problem . . . if you're looking for greater efficiency, write today, we'll be glad to furnish complete details on the S-D "Completely Sealed Automatic," and how they are used in mines similar to yours. Seeing is believing, just contact us.

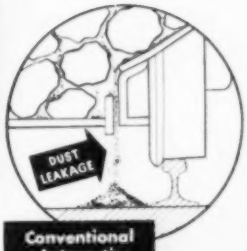


..When You're "Sealed" HERE

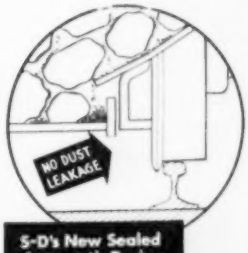


Every S-D "Sealed Automatic" Has The Exclusive DUST-ROOF SEAL . . .

The "Dust-Roof" seal consists mainly of a car sill construction that permits extension of the sides into the car to form a "Dust-Roof" over the necessary clearance space between the drop bottom door and the car frame. This "Dust-Roof" extension carries the dust across the clearance space and deposits it in drop bottom door. (As illustrated in the photo above and the cross-section drawing below at right). Without this "Dust-Roof," the dust follows the side down until it reaches the clearance space where it dribbles through and accumulates on the tracks (as illustrated in the cross-section drawing below at left.) To make this sealed-car 100% effective, even the wheel hoods are dust sealed. With the S-D "Completely Sealed Automatic," the dust is sealed-in until the doors are tripped at the bin. The expense of track clean-up is eliminated.



Conventional Automatic



S-D's New Sealed Automatic Design

Sanford-Day Iron Works

KNOXVILLE TENNESSEE

8 A.M. EFFICIENCY

maintained **ALL DAY**
with **ORTON**

ONE-MAN

AERO-CRANE

POWERMATIC AIR-CONTROL

No Afternoon Fatigue Let-Down

One Man, with the Powermatic Air-Control Orton Aero-Crane loads and unloads cars, trucks, gets material onto the stockpile and off with *early-morning* efficiency *all day.*

Effortless Orton air-control enables one man with the Aero-Crane to handle 200 to 1000 lb. loads that eat up the time of a yard crew. Aero-Crane pays for itself in saved man hours.

Designed to SPEED Yard Work

Orton one-man Aero-Crane travels rapidly job to job with boom in any position.

Insures SAFE lowering of heavy loads against *compression of the engine.*

Full-view cab. Full circle turntable. Anti-friction bearings. Non-burn Orcoin V-type clutches. SAFETY spring-applied, air-released hoist brakes. Electro-welded construction.

Eight models, 3,500 to 60,000 lbs. capacity. Diesel or gasoline powered.

Send for Catalog 73-B for full details and roster of Orton world-wide users

◀ Long-life Orton Aero-Crane has most rigid car body of any crane built. Goes anywhere a truck will go. Operated, traveled and steered from craneman's seat.

ORTON **CRANE & SHOVEL COMPANY**
608 South Dearborn Street, Chicago 5, Illinois

EASIER TO SEE...SAFER TO USE

U.S. Royal Gold Cables

These mine trailing cables have a golden yellow color, for high visibility. They provide new highs in safety —without loss in efficiency.

The jacket is made of tough *pressure-cured* Neoprene —highly resistant to abrasion, cutting, heat, moisture, and oil. Beneath the jacket, a strong cotton braid covers the insulation.

The insulation itself is the finest rubber compound, with a tensile strength as high as 1400 pounds per sq. in. Conductors are of annealed coated copper, the stranding of which is designed specifically for mine trailing cables.

U.S. Royal Gold Cables are approved as tough enough for your roughest jobs only after they have passed seven gruelling "torture" tests. They are approved as flame-resistant by the Pennsylvania Department of Mines. ALL U. S. ROYAL MINING MACHINE AND LOCOMOTIVE CABLES ARE AVAILABLE IN BLACK OR NEW GOLDEN YELLOW. Write today for free sample to United States Rubber Company, Wire and Cable Department, 1230 Avenue of the Americas, New York 20, N. Y.

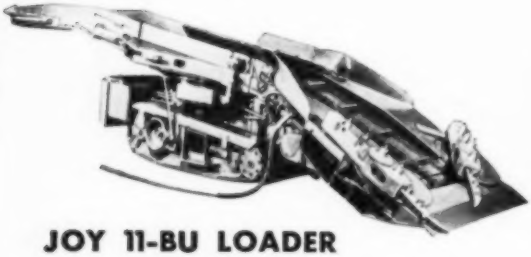
APPROVED AS FLAME-RESISTANT

BY THE PENNSYLVANIA DEPARTMENT OF MINES

The 10-RU can make horizontal cuts anywhere from the roof down to 5½" below floor level.

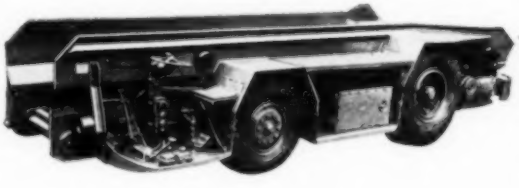
FULL SEAM MINING

Follow the 10-RU *Universal* CUTTER with JOY LOADERS and SHUTTLE CARS



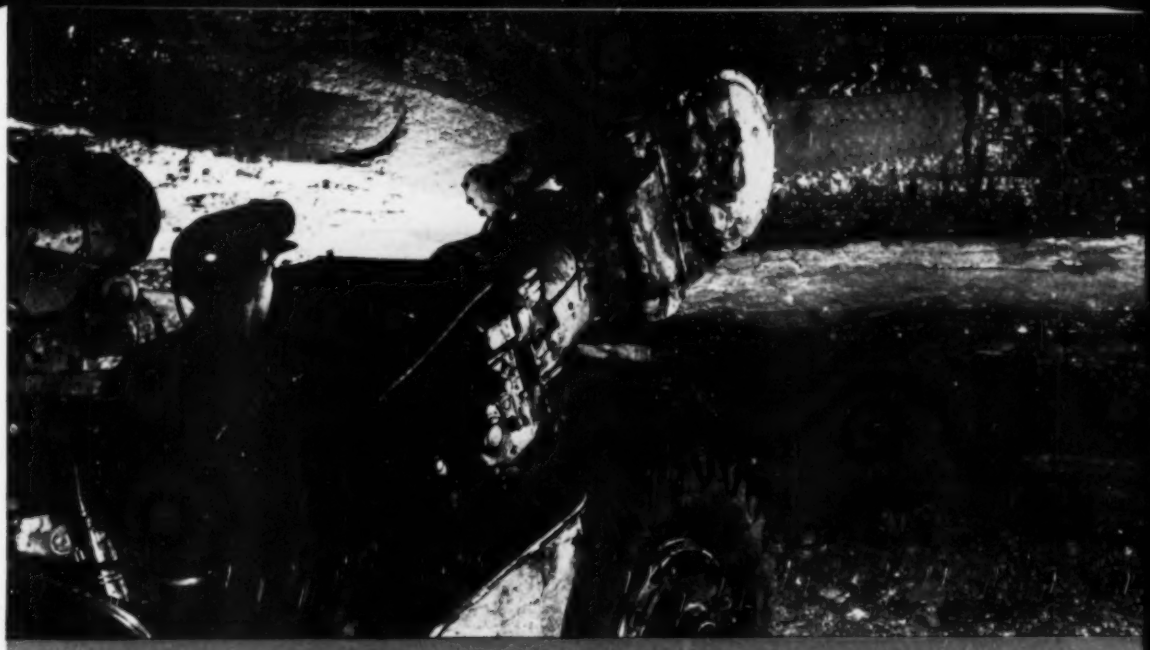
JOY 11-BU LOADER

A heavy duty, high capacity machine which can load both coal and rock partings in full seam, trackless mining. Loads up to 10 tons per minute in seams 60" or more.



JOY 60-E SHUTTLE CARS

The other half of the JOY loading-out team—a 10-ton capacity cable-reel Shuttle Car that hauls both coal and rock in full seam operations. The 60-D is battery-powered.



Shear cuts can be made anywhere in the face with the JOY 10-RU Universal Cutter.

...It's EASY with the JOY 10-RU CUTTER

HERE'S WHY JOY MACHINES LEAD IN MODERN FULL SEAM MINING

● JOY Machines bring you *double* advantage: they combine the merits of full seam mining with those of trackless mining, for greatest production per shift.

● The JOY 10-RU Universal Cutter is a fast-tramming, powerful machine which gives you the *faster* cutting required in trackless mining.

● The 10-RU makes both the shear cuts and horizontal cuts that full seam mining requires, to assure sufficient shattering of the parting for maximum loadability.

● JOY Loaders and Shuttle Cars stay right behind the Cutter—assuring the greatest possible tonnage loaded out, at the least cost per ton.

Write for Bulletins, or

Consult a Joy Engineer

The 10-RU is licensed under the Patent to E. C. Morgan, No. 1,953,325

WAD-CL-2347

JOY MANUFACTURING COMPANY

GENERAL OFFICES: HENRY W. OLIVER BUILDING · PITTSBURGH 22, PA.

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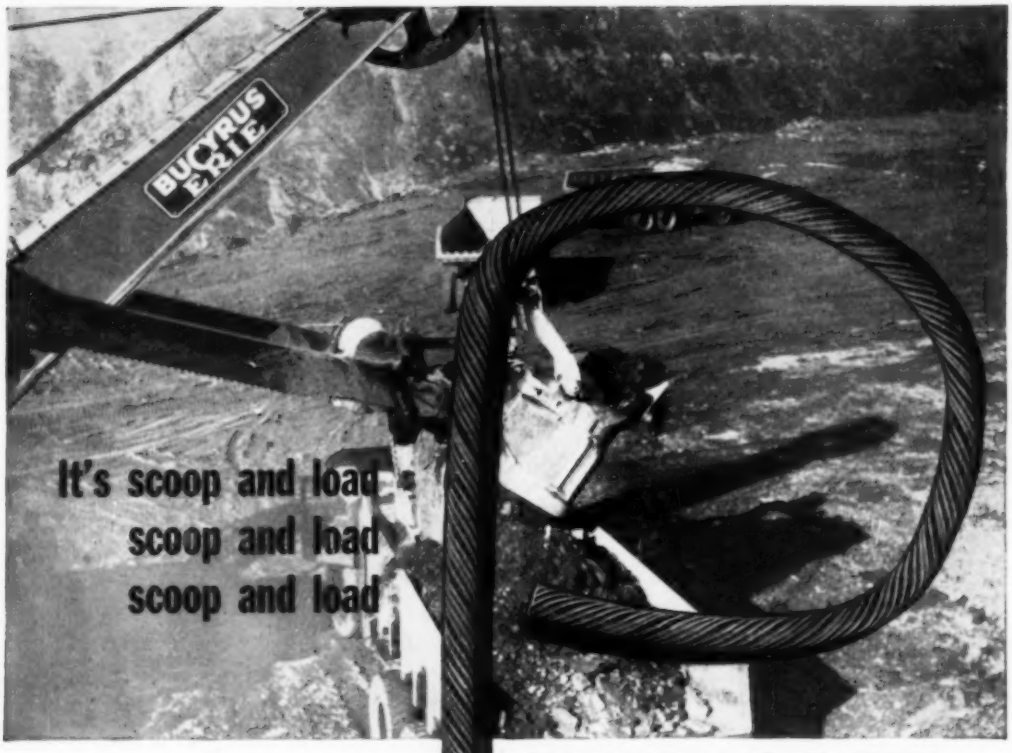

when you shoot with

You keep a fast-moving procession of trucks under your shovels when you blast with Primacord. Because Primacord works to produce the kind of well-broken ground that makes digging much easier.

Then - - - costs go down

. . . profits go up.

RIMACORD

Primacord is flexible, easy to handle and hook up with square knots and half hitches. Down-hole lines contact every cartridge; when a shot is fired the entire charge from top to bottom initiates with peak explosive power. Trunk lines can be laid out so that front holes fire a split-second before succeeding ones; this gives you relief of burden that adds a whopping jolt to fragmentation.

A non-conductor, Primacord is insensitive to stray currents, comes wound on light-weight spools in three different grades. Ask your explosives supplier which you should use . . . or write us direct.

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PRIMACORD-BICKFORD Detonating • Fuse •

Devoted to the Operating, Technical and Business Problems of the Coal-Mining Industry

Coal Age

MARCH, 1949

IVAN A. GIVEN, EDITOR

Critical Period

THE OUTCOME of the Truman proposals for implementing the Fair Deal now rests with Congress. The struggle is under way, with present indications leading to the tentative conclusion that substantial modifications will be adopted when final action is taken. That is as it should be. In the field of labor legislation, for example, there appears to be growing sentiment even among the Fair Dealers that wiping out the safeguards of the Taft-Hartley Act would be too much of a backward step. Among other things of direct interest to the coal-mining industry, repealing the Taft-Hartley Act would again make seizure a real threat. In fact, seizure as a means of coping with national emergency strikes was openly advocated by William H. Davis, former War Labor Board chairman, in testimony on the administration's labor bill.

Over all, the Fair Deal involves greater centralization of power over business, commerce and the individual in the hands of the federal government. Direct competition with business is inherent in river-valley, steel-production and other proposals. Greater federal power over the individual would be an inevitable result of the Fair Deal's scheme for socialization of medical services and other proposals for regulating personal activities. Even military defense is being considered as a means of expanding governmental powers. Truman's advisors are getting behind the idea that a strong and growing economy rather than a large peacetime military force is the best defense foundation. There is, of course, real merit in the idea. However, these same advisors also see it as a means of justifying more governmental intervention and direction of business in accordance with their ideas of preventing a recession or depression. And, since all these proposals for enlarging the federal establishment require more money, the inevitable result is intensified pressure to transfer more spending power from individuals and corporations to the government by raising taxes.

The Fair Deal, if adopted in its entirety, would cut both wide and deep. But, as previously pointed out, it is highly doubtful if Congress will swallow it completely, particularly if valid contrary evidence is offered in adequate volume and in plenty of time. Coal mining has particular reason, in view of the record of the immediate past, to fear the results of expansion in governmental power. More than ever, therefore, coal men should keep their guards up in this critical period and stand ready to put their case before the Congress, backing it up by every possible effort to promote safe operation and attain better relations with employees, customers and the general public.

Efficiency Key

NOW THAT COST has become once more a key factor in coal-mining affairs, the emphasis again is on ways of increasing efficiency. New and better machines are, naturally, an obvious answer. Another, perhaps less obvious but nevertheless equally important, is doing better with the equipment on hand. What are the steps that can be taken in this direction? Careful study of operating methods and the elimination of bottlenecks is one. A second is incentive for extra effort. A proposal with real merit is the offering of a prize or prizes for outstanding crew performance by the coal industry, the equipment manufacturers or both. Prizes and awards already are offered for safety and other achievements. If they are effective in these fields, they should be equally effective in raising efficiency and thereby giving the industry a valuable lift in a field where it is really needed.

Social Security for Miners and Others

	Date established	Actuarial basis	Scope: Local, miners only	Scope: National, All workers	Scope: National, Extras for miners	Scope: Miners alone	Administration: Union	Administration: Operator	Administration: Government	Administration: Neutral	Benefits: Pensions	Benefits: Disability	Benefits: Hospital care	Benefits: Rehabilitation	Benefits: Unemployment	Benefits: Family help	Benefits: Medical research
Australia	1942	*		Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes				
Belgium	1945	No	Yes	Yes					Yes		Yes	Yes	Yes			Yes	Yes
Britain	1920-48	Yes		Yes	Yes				Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes
Canada: Alta. and B. C.	1946	No	Yes	Yes			Yes	Yes	Yes	Yes	Yes	Yes			Yes	Yes	
Nova Scotia	1923-46	No	Yes	Yes			Yes	Yes			Yes	Yes					
Czechoslovakia	1900-48	No		Yes	Yes		Yes	Yes	Yes		Yes	Yes	Yes	Yes		Yes	
France	1900-47	No		Yes	Yes		Yes	Yes	Yes		Yes	Yes	Yes	Yes		Yes	Yes
Germany (Ruhr)	1929	Yes		Yes	Yes		Yes	Yes			Yes	Yes	Yes	Yes		Yes	Yes
Holland	1919-45	Yes		Yes		Yes	Yes	Yes			Yes	Yes	Yes	Yes		Yes	Yes
India	1944-48	No				Yes	Yes	Yes	Yes		Lump sum	Yes					
Japan	1922-47	Yes		Yes	Yes				Yes		Future	Lump sum	Yes		Yes	Yes	
Russia	1947	No		Yes		Yes			Yes		Yes	Yes	Yes			Yes	
South Africa: Whites	1940	No		Yes		Yes		Yes			Yes	Yes	Yes	Yes		Yes	
Natives	*	*	Yes					Yes			No	Yes	Yes	Yes			
United States	1947	No		Yes		Yes	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

*Not stated by reporter.

HENRY HADDOW, 62-year-old Australian, retired in 1947. He owns his home but hangs out with old friends at the nearby "pub." A garden, a healthy wife, two miner sons, a $60-a-month pension, a motorcycle and a dog and kitten keep him happy.

VACLAV KASAL, Czech miner, was pensioned 15 years ago at age 60. He has run the house ever since his wife took rheumatism 40 years ago. On a $34-a-month pension, he lives in an old two-room house with electricity but no running water.

Pension Plans for Coal Miners

	Source of Income				Eligibility				Coverage			Payments				Retirement optional	Wage plus pension if still working
	Tonnage levy	Employers' tax	Worker contribution	State subsidy	Age	Years of service	Disability	Union membership	Miners	Clerks, office help	Supervisors	Avg. monthly pension	Ratio, pension to wages	Widow's part of pension	Child's part of pension		
Australia		5/10	2/10	3/10	60	15	Yes	Yes	Yes	Yes	Yes	$33.60	1/3	1/4	1/20	No	
Belgium		3/4	1/4	Deficit	55	20	Yes	No	Yes	No	Yes	$41.40	1/3	*	*	Yes	*
Britain	7c.		25c. month		65	*	Yes	No	Yes	Yes	Yes	$21-$82	1/4-All	7/5	1/3	Yes	*
Canada: Alta. and B. C.	5c.				*	*	Yes	Yes	Yes	*	*			Lump sum, $250		*	*
Nova Scotia		All			65	25	*	No	Yes	Yes	Yes	$36	1/4	Lump sum, $150	*	Yes	*
Czechoslovakia		1/2	1/2	Deficit	55	25	Yes	No	Yes	Yes	Yes	$42-$71	1/2 9/10	*	*	Yes	Yes
France		1/3	1/3	1/3	60	15	Yes	No	Yes	Yes	Yes	$26.75	1/2	1/4	1/7	No	
Germany (Ruhr)		4/9	2/9	3/9	65	25	Yes	No	Yes	No	No	$33	3/4	3/8	*	Yes	Yes
Holland		1/2	1/2	Deficit	55	25	Yes	No	Yes	*	*	$10-$84	1/5-9/10	1/4 1/2	1/13	Yes	Yes
India		1/2	1/2		50	5	Yes	No	Yes	*	*	Lump sum	*	Lump sum	*	Yes	
Japan		1/2	1/2		*	15	Yes	No	Yes	Yes	Yes	*	1/3	1/6	1/36	Yes	Yes
Russia	*	*	*	*	50	20	Yes	Yes	Yes	*	Yes	$130	1/2	1/2	*	Yes	*
South Africa: Whites		All			60	15	Yes	No			Yes	Lump sum	*	Lump sum	*	Yes	
United States	20c.				62	20	Yes	Yes	Yes	No	No	$100	1/3	$1,000 plus 3/5 pension	1/10	Yes	No

*Not stated by reporter.

Miner Welfare Abroad

Coal Miners Lead Other Workers in Welfare and Pensions Around the World, 12-Nation Survey Shows—Most Miners Pay Part of Funds But Employers' Load Is Heavy—Benefits Vary Widely—Governments Play Strong Hand

WHAT ARE THE FACTS about coal-miner welfare and pension plans around the world? Compared with other industrial workers, how do pensioned miners fare? Do they share in providing for their own needs, or do they line up only on the receiving end? What can coal men in the United States, miners as well as operators, learn from welfare plans abroad?

To get the facts, *Coal Age* asked McGraw-Hill World News correspondents in 12 foreign countries to gather data from company, miner and government officials on what retired coal miners get, how they fare and how their welfare machinery works. Four correspondents actually visited retired miners' homes. The reports of these newsmen, stripped down to the essential facts, make up the following pages.

In general, welfare programs and pension plans put coal miners in a favored class everywhere. With few exceptions, they get their cut from social-security schemes granted to all workers. In addition, if their government does not add special benefits for coal miners—and many governments do—they have their own special funds, set up by special laws or by their employers.

The reasons for putting coal miners in a class by themselves are strong. Miners, it is felt, ought to get some extra breaks because their work is dangerous. Besides, since miners often vote as a bloc, politicians who want to gain power or keep it often seek the miners' favor by granting or plugging for special benefits.

The top reason for favoring coal miners, however, is that they produce the coal the whole world needs. That is why miners in Holland and Czechoslovakia, for instance, get supplementary pensions for old age and disability ranging up to nine-tenths of their average earnings before they retired and why injured miners' benefits in England equal the regular wage guaranteed to active miners.

Nearly everywhere, the employer bears the brunt of the cost, not only for pensions but for general social security as well. In France, for example, though miners and managers share the cost of pensions equally, the operators pay four times as much into social-security funds as the miners do. The result is a back-breaking strain on France's coal industry, which ran up a deficit of several billion francs last year.

Whatever the cost to coal companies, however, the miner himself does share the cost of his pensions in 9 of the 12 countries where information was available. In Australia, for instance, the ratio of miner to employer contributions is 2 to 5; in Belgium, 1 to 3; in Germany, 1 to 2; in Holland and Czechoslovakia, 1 to 1. In six countries, the government shares the cost. In England and parts of Can-

Coal Miners a Favored Group Around the World

GERARD SMEETS, Dutch miner for 37 years, lives in his own home with wife and children. A garden and pigs, a few odd jobs and his working children help stretch his $42-a-month pension. Motorcycling is his main hobby.

ada, a tonnage levy supports the fund partly or entirely. Union membership is a requirement for pensions or additional benefits in only three of the countries surveyed.

The lowest eligibility requirements for a pension are in India, where a miner may draw a lump-sum payment at age 50 after only five years in the mines. He does not get much, however—only $18.18 for each year of service. Retirement is next easiest in Russia, where a miner may go on pension at age 50 after 20 years' work. Miners in the German Ruhr must work longest before quitting—25 years' service and age 65.

In most countries where retirement is optional, a miner may draw his wages plus pension if he keeps on working. Elsewhere, in Czechoslovakia the size of the pension is geared to length of service, enabling a miner with 40 years' service to draw 90 percent of his former wages.

Mostly, payments average about one-third to one-half of wages. Even so, with a garden in the back yard and some help from children now at work, pensioned coal miners get along all right in most countries.

Holland

IN HOLLAND, with their own welfare fund separate from general social security, coal miners are better off than most Dutch industrial workers. Their plan, started in 1919 after a government study of needs, covers miners, from supervisors on down, in private and state-owned mines. Managers and workers share direction of the program, which provides hospitalization, rehabilitation, payments to widows and orphans, pensions and some medical research. A separate fund supported by the companies provides social and recreational facilities and a national fund takes care of permanent disability cases.

With miner employment close to 41,500, there now are about 8,325 miners and 300 white-collar workers on pension. In 1948, 435 men began drawing pensions and 280 pensioners died—an average year, according to officials of the General Mineworkers' Fund.

To support their pension-and-sickness fund, miners put in 7½ percent of their wages and their employers match the total. The government subsidizes any deficit. Last year, miners and employers each paid in about $3,900,000 and the government added $2,800,000. Income from other sources was $1,471,000. In the same year, payments for pensions, widows and orphans added up to $3,245,000; for medical treatment and rehabilitation, $1,207,500.

Underground workers may retire on pension at age 55 after 25 years' service; surface workers at age 60. The maximum pension is 70 percent of the highest wages earned, with the addition of $23 per year for each child under 16.

Since pension payments were boosted in 1936 and 1945, miners who now are young will get more upon retirement than men who already are retired. For example, take a miner who started work at age 15. If he goes on pension for disability at age 35 in 1949, he will get about $10.50 a month, 19 percent of his last wages. If he starts his pension at age 55 in 1949, he will get $48 a month, 40 percent of his pay. If he is disabled and therefore retired in 1979 at age 35, he will be paid about $39 a month, 33 percent of his former earnings, but if he turns 55 and quits in 1979, his pension will come to $84 monthly, 70 percent of his last wages.

A widow's pension is half of what her husband was entitled to when he died, plus $50 a year for each child under 16. If both parents die, a miner's child under 16 draws $88 a year. Burial benefits amount to $56.60 for a miner or his wife, $23.80 for a miner's parent and from $9.50 to $28.30 for a miner's child.

At very low cost, miners and their families get medical care, hospitalization, medicines and a room in a nursing home, plus 80 percent of the breadwinner's wages if he gets sick. White-collar workers have to pay a little more for these services.

Under Holland's all-industry disability laws, a miner gets a disability pension if he has paid into the fund for 10 years. If he is totally disabled, his pension is as big as if he had worked until he reached pensionable age.

To see how a retired Dutch miner gets along, take the case of Gerard Smeets, who retired in 1946 after 37 years in the mines. With his wife and eight children, he lives in a well furnished 8-room house on a tidy street in Simpelveld, a small town near the mines. Gerard built his house before the war and gave

MODERN BATH HOUSE reflects England's special benefits for miners, including old-age and disability pensions, canteens for extra food, hospital and medical care.

it a new coat of paint last year. The family has a radio, vacuum cleaner, washing machine and sewing machine. In the back yard, a neat shed provides room for a laundry and shelter for the family bicycles and Gerard's motorcycle.

Although Gerard's $42-a-month pension leaves a wide gap between income and the cost of living, his two miner sons and three other working children help balance the budget. Gerard himself does some odd jobs now and then for money to buy clothes, a little gasoline for the motorcycle and some tobacco.

Looking back at his miner's life, Gerard has no regrets. He never had an accident and, except for appendicitis and a little pleurisy, never was sick. His working conditions, he adds, always were good. He thinks his present life on pension, with his wife and children close at home, is pretty pleasant, a fair reward for a life well spent.

Belgium

BESIDES SHARING in over-all national social security programs, Belgian coal miners get special pension and disability benefits set up to encourage new men to enter coal mining and old miners to stay on the job. In fact, Belgium needs miners so badly that she grants the same special benefits to immigrant miners as to native Belgians and has reached agreements with Italy, France, Holland and Luxembourg whereby those countries give seniority and pension privileges to their own citizens who come to Belgium for temporary work in the mines. Employment now is about 174,000 men, 70,000 of whom have come from outside Belgium.

Broadly speaking, the country's social-security plan provides hospitalization, medical care and medical research; and the National Miners' Retirement Fund provides pensions, disability benefits and payments to miners' widows and orphans through a special government commission.

The miners' special fund is financed by contributions from workers, who pay in 8 percent of their wages; from employers, who pay sums equal to 23 percent of underground workers' wages and 19 percent of surface workers' wages; and from the government, which makes up any deficit in the fund. Parliament has revised payments upward five times in the last four years, but pensions, which amount to one-fourth to one-third of average earnings, still are hardly enough to meet the increased costs of living. There now are 44,226 former miners drawing old-age pensions, 13,461 getting disability payments and 33,000 widows and children drawing benefits.

The annual income of the old-age and disability divisions of the miners' fund totals a little over $46,000,000—from miners, $10,000,000; from companies, $13,386,000; and from the government, $23,000,000. Expenses add up about as follows: for pensions, $23,000,000; for disability payments, $5,750,000; for widows and children, $6,900,000.

Retirement is optional at age 55 for underground workers with 20 years' service or at any age with 30 years' service; for surface workers, at age 60. Union membership is not required, and office workers and clerks, being covered by national social-security laws, are not included. Foremen and supervisors share benefits with the miners.

Old-age pension payments, which average $41.40 per month for underground workers and $32.20 for surface workers, are computed as follows:

Underground workers, married—$365 a year plus $18.28 for each year's service over 20; unmarried—$242 a year plus $14.95 for each year over 20.

Surface workers, married—$299 a year plus $14.95 for each year over 20; unmarried—$197 a year plus $9.86 for each year over 20.

If an injured underground worker is so disabled that he can do only surface work after his accident, he retains his rights to a full underground pension when he reaches retirement age. In addition to everything else, all pensioned miners, whether overage or disabled, get an annual amount of free coal determined by length of service in the mines. In 1948, free coal for this purpose was valued at $4,400,000.

Germany

GERMAN WELFARE schemes for coal miners, dating back to the Middle Ages, were so good that Germany's modern cover-all social-security plan was based on them. With miners enjoying bigger benefits and easier eligibility than other workers, the program now provides hospitalization, sick care, old-age and disability pensions, rehabilitation and support for widows and orphans. The miners' pension and health plans are run separately from the national program by regional committees having equal labor and management representatives. Any major changes in the plan must be made by legislation.

The average full-scale pension for a miner in the German Ruhr comes to about $33 a month. With high prices, that is not a great deal and the miners' union now wants higher payments, to be financed by a tonnage levy.

Because pension benefits increase with each year of service, even beyond retirement age, about one-fourth of the 160,000 overage or partially retired miners in the Ruhr now are getting some pension benefits while still working in the mine or elsewhere. In addition to these men, 110,000 widows and 38,000 or-

phans now are getting something from the miners' fund.

Of the total pension fund, the government pays one-third, the miners two-ninths and the mine owners four-ninths. Sick relief and hospitalization, handled separately from pensions, are supported by equal contributions from miners and operators. Monthly income to the Ruhr pension fund totals about $7,800,000—$1,950,000 from miners, $3,750,000 from the companies and $2,100,000 from the government. Expenses add up to about the same—$5,100,000 to pensioned miners, $1,950,000 to widows and orphans, $360,000 for hospital and medical care and about $235,000 for administration. Payments from the sick fund are about $1,800,000 a month.

To determine the size of pension payments, miners are divided into three classes, as follows:

1. Underground men, aged 50 with 25 years' employment, 15 of which must have been underground, may draw an $18-a-month pension whether they continue work or not. The longer they work, the bigger their pension.

2. Surface and underground men with five years' service who cannot do heavy work because of disability are given light work and paid a pension of 1.5 percent of total wages since they started work. This averages $21 a month, plus $4.50 for each child under 16.

3. Underground and surface men aged 65 with 25 years' service, as well as men rated two-thirds or more disabled, draw full pensions—2.4 percent of total earnings since first employment, an average of $33 a month. Retirement is optional.

In addition to these benefits, miners, their wives and children get free medical and hospital care. To take care of these needs, the Ruhr group owns six hospitals, six rehabilitation homes and a sanatorium.

Australia

IN AUSTRALIA, though miners share in national hospitalization, old-age pensions, disability payments and care for widows and orphans, they have also their own pension plan and the Joint Coal Board, a government agency, is giving attention to special coal-industry welfare.

Under the Miners' Pension Act of 1942, miners must retire at age 60 after 15 years' service. The pension funds are financed by workers, employers and the government in the ratio of 5:15:8. The average monthly pension is $33.60 and the maximum is $71.68. In addition, an allowance of $24.60 is made for a wife and $6.40 for a dependent child.

These payments are enough to buy food, but little else. When a miner turns 65, his own fund stops full payments and the state takes over his pension, paying him even less than his miner's pension and then only if he has no other means of support. In many cases, the miners' fund has to supplement state old-age payments.

The miners' pension fund is run by a joint board of state, union and operator representatives. Since Australian mines have a closed shop, union membership is required for pension payments and all employees, from supervisors down, share the benefits.

All employers must carry workmen's compensation, providing hospital care, permanent disability payments and family benefits for occupational accident or death. In some mines, premiums run as high as $2.25 per ton. For non-occupational accident or sickness, the costs of hospital care and medicines are borne by the state, supplemented in some areas by miners' own funds.

The Australian miner's big complaint is his living and working conditions, which generally are below British and American standards. The union now is driving for better change rooms and bath houses, town sewerage, recreation parks, swimming pools and better houses, all to be financed by a tonnage levy. Operators, however, contend that costs already are close to coal's ceiling price—$5 per ton. In some districts where this royalty already has been imposed, the government is matching it dollar for dollar to improve mining-town life.

Even so, the life of a retired Australian miner is not bad. Henry Haddow, for instance, quit work two years ago at age 60. Henry started work in the pits in Scotland when he was 12. In 1924, when he was 37, he and his wife moved to Australia and he found work right away in the mines, though he had expected to become a farmer. Now, Henry remembers a good deal of dirt and misery, both in Scotland and in his adopted home, but he credits his union with the improvements in his later years—better wages, better working and living conditions, paid holidays and, at last, a pension.

In 1942, Henry bought the clapboard house he lives in for $500 and spent $150 fixing it up. The furniture is not modern, but he remembers that his father, who died in Scotland at 77, never even owned a home.

Henry's $15-a-week pension, added to about $25 from his miner son David, keeps things going all right. Henry does not worry about the rent, his garden and chickens cut down the food bill, and if he or his wife gets sick, hospital care is free. They go to the movies twice a week (once a week the union pays for it) and listen to the radio a good deal, but most of the time Henry just hangs out with his old friends at the local "pub." He does not talk about "the good old days"; for him, the best days are now.

Japan

THE JAPANESE COAL MINER is protected under the broad umbrella of accident, unemployment and health insurance and pensions set up for all industrial workers under the guidance of the military occupation after the war. In addition, he gets a few concessions of his own.

Run on a national basis by government bureaus, Japan's social-security machinery is cumbersome and must be revised often to offset inflation. Workers will not realize full benefits until some years hence. Pensions, for example, will not be paid until 1955 or 1957.

Funds for workmen's compensation are provided by employer contributions; for unemployment, health insurance and pensions, by joint contributions from workers and employers. The government pays all administrative costs and one-third of the sum needed for unemployment insurance. Total annual payments into pension, unemployment and health funds covering all industrial workers amount to about $9,387,000 by workers, $17,580,000 by employers and $280,850 by the government.

Generally, retirement is possible after 20 years' service in industry. However, this requirement is cut to 15 years for underground workers. In fact, for a time during the war, underground miners were granted double time toward eligibility for pensions. The first old-age pensions will be paid in 1957 to underground workers who were at work in 1942, except for those who got double credit in wartime, who

will retire in 1955. The pension payment per year will equal four months' average wage. Retirement will be optional and union membership will not be required.

For disability, Japan's national plan provides full medical care and pays 60 percent of a worker's wages up to three years. For permanent disability, a lump-sum payment is made, ranging from 670 days' pay for partial disability up to 1,340 days' pay for total invalidism. However, the only hospital facilities available are company owned and controlled. They provide medical care for workers and their families.

At the time of a worker's death, the national plan pays to his widow and children a lump sum equal to 1,000 days' wages. If the deceased participated for the minimum years in pension insurance, his survivors are paid a pension totaling two months' wages per year plus 10 days' wages for each dependent.

Britain

WHEN THE BRITISH GOVERNMENT nationalized the coal mines two years ago, it dovetailed independent miners' welfare schemes into the nation's cradle-to-grave social security plan for everybody. The job was done without upsetting the complex pattern of miner-welfare endowments that had grown up since 1920 and without angering the miners who, besides being proud of their own welfare plan, are a strong political bloc. The result is that British miners now benefit by over-all social security and workmen's compensation as well as by a Supplementary Scheme for Colliery Workers which became law in July, 1948.

A national miner-welfare program got its start in 1920, when the Mining Industry Act set up a Miners' Welfare Commission and a welfare fund financed by a 1.6c. levy on deep-mine tonnage. The law forbade pensions from this fund, leaving this matter to companies and their workers. In 1947, the National Coal Board took over and enlarged this commission and assumed the tonnage levy.

From 1920 through 1948, the commission built the following: 356 pithead baths to accommodate 400,000 miners at a cost of $28,000,000, with the NCB now paying operating costs formerly borne by miners and employers; colliery canteens and snack bars now doing an annual business of $28,000,000; recreation and social centers, especially in isolated mining towns, costing $120,000,000; and 10 big health and rehabilitation centers costing $4,000,000, plus 53 small centers, with $600,000 each year provided for maintenance.

Meanwhile, after 1920, some coal companies had set up their own miner pension plans. When the mines were nationalized, 80,000 workers were eligible for pensions under these plans. The NCB took over these schemes, continuing payments to those who were then drawing pensions but refusing to extend the scheme further.

As the whole plan now stands, British miners benefit by the nation's birth-to-burial social security, workmen's compensation and additional grants made especially for miners. The system breaks down like this:

Insurance Act, covering everybody—Workers contribute $3.68 monthly; employers, $3.16; government, $1.68. For old age, sickness or unemployment, a worker gets $20.80 monthly; his wife, $12.80; his child, $6. For a death benefit, a widow draws, for the first three months, $28.80 monthly, plus $6 for one child and $4 for each additional child; for the second three months, $20.80 monthly plus $6.80 for a child.

Industrial Injuries Act, providing benefits additional to the above but paid only to industrial workers—A worker contributes 26c. per month, his employer the same, and the government 10.4c. Monthly payments for the first three months of disability are $36; for the second three months, from $7.20 to $36; for permanent invalidism, $52. For a widow, payments are $12.80 for the first three months and $24 for the second three months, plus $6 for a child.

Supplementary Scheme for Colliery Workers, paid in addition to all above—Monthly contribution from a miner, 25.2c.; from a woman worker, 20c.; a boy under 18, 16.4c.; a girl under 18, 13.2c.; the government, 6.6c. per ton. Benefits are $16 monthly for injury and $2.40 to $12 for disability; for death, a miner's widow without children gets $4; with children, $16.

Insurance and workmen's compensation are run by the government. The miners' supplementary plan is run by a national committee of 10 men—four from the NCB, four from the miners' union, one from small-mine owners and one from the national insurance board. However, local miner-management committees in each of the country's eight geographical districts have a good deal of authority.

Canada

IN CANADA, there is no nationwide pension or benefits scheme for coal miners except as they share in unemployment, old-age and family grants with all other industrial workers. However, the two U. M. W. A. districts, along with the operators, recently have shown some interest in coal-miner welfare plans. Even now, with a skeleton welfare setup in Alberta and British Columbia and with two company plans in Nova Scotia, there exists a framework for building a more adequate welfare plan.

In Nova Scotia, the Dominion Coal Co. and the Old Sydney Collieries have had their own pension plans since 1923 and 1946, respectively. At age 65 after 25 years' service, employees of these companies become eligible for pensions up to $75 a month, the average payment being about $36, equal to one-sixth of normal average earnings. The catch is that the working capital of the fund is small and that workers who become eligible must wait for their pensions until present pensioners die. Recently, in one year, for example, the Dominion Coal Co. paid out $109,000 to 247 men on pension while 700 men still working were eligible for pensions by virtue of age and service.

In Alberta and British Columbia, the U. M. W. A. climaxed a welfare-fund drive by winning, in 1946, a 3c.-per-ton levy on production, increased in 1948 to 5c. a ton. Administration of the fund is vested in a three-man board of union and operator representatives and a neutral member. From the tonnage levy, 1948 income was about $450,000. Thus far, the only payments made have been death benefits of $200 to $250 that were paid to widows of union miners.

Canadian miners do have, however, the country's general welfare benefits to fall back on in case of need. Workmen's compensation pays a worker two-thirds of his earnings during disability and provides a funeral allowance of $150 to $175 for occupational death, plus a pension of $50 a month for a widow and $10 for each dependent child. At age 70, if a worker is without means of support, he draws an old-age pension of $35 to $37 monthly. Funds provided by the government,

workers and employers take care of weekly unemployment payments if needed.

India

IN INDIA, though wider benefits are shaping up, coal miners now get little consideration. One program, set up in 1944 and revised in 1947, levies a 12c. tax on coal shipments to support coal-field hospitals, health work, adult education, child care and housing. This plan, which takes in an estimated $2 per year per worker, is administered by a joint commission of government, management and labor.

A second welfare plan for miners, started in 1948 after long years of discussion, sets up a retirement fund run by another joint commission and financed by a 6-percent contribution from miners earning less than $90 a month and by an equal sum from employers. Benefits, accumulated at the rate of $18.18 per year for every year of employment, are paid in a lump sum at age 50 or for permanent disability, death or withdrawal from coal-mine work. A retiring miner may not withdraw his employer's contribution to the fund unless he has worked for five years. Since this plan was started only last year, there still is no estimate of its income or costs.

South Africa

IN SOUTH AFRICA, white men, who usually are the supervisors, get pension, disability and death payments, as well as free hospitalization. Natives share workmen's compensation with whites, get some free medical care in most coal fields and, if sick or injured at work, get free transportation back to their villages.

The plan for whites is supported entirely by the operators through a $6.50-per-month contribution for each employee.

A lump-sum pension payment, $92.69 for each year of service, is made when a man retires. Retirement is not compulsory but may take place at age 60 for underground men, 63 for surface men and 55 for women workers. Similar payments are made for death or permanent disability after 15 years' service.

The Transvaal Chamber of Mines and the Natal Coal Owners' Association, two groups of operators, run the program. A worker may move from one company to another without losing his benefits, but he may not interrupt his 15-year service period for more than two years without having to start over again.

Native miners who need it get free medical treatment, usually from the company hospital or from medical centers provided by labor-recruiting agencies. These workers come mostly from villages some distance away, work for a while and then return home for months, sometimes years, before they look for coal-mine jobs again.

Usually, sick or injured natives prefer to go back home. Special sick coaches of the South African Rwy., provided with medical orderlies, carry them back to the village. Native workers who have come from Portuguese East Africa are moved back home without cost through the Witwatersrand Labour Association, Ltd., which also maintains a fully equipped hospital. South African natives get much the same treatment from the Native Recruiting Corp., Ltd.

Russia

BY GOVERNMENT DECREE in September, 1947, Russian miners were granted bigger bonuses, increased pensions, and housing, educational and other benefits as a spur to higher output. The benefits cover underground workers, engineers and supervisors and are in addition to free medical services, cultural projects and other aspects of Russian social security.

The Russian miner's wage is automatically increased 10 percent after his first year's service and is boosted yearly thereafter up to 30 percent for 15 years' service or more. Retirement comes at age 50, when miners with 20 years' service begin to draw pensions equal to 50 percent of their wage prior to retirement. Those who keep on working after reaching 50 get both wages and pensions and are allowed to keep their living quarters for life. Twenty-five years' work entitles a worker to buy a low-priced home with a small plot of land and to send his children to school for half the usual cost.

A Russian miner who is disabled on the job draws a regular pension as though he had been retired for age, plus disability benefits for himself and his family. Disability payments are computed on bonuses up to $187.50 a month over and above base pay of $75. For complete disability, a miner gets his pension plus 20 percent of wages earned above base pay. If he is partly disabled but can work under special conditions, he draws his pension plus 15 percent of wages above base pay. Finally, if he is partly disabled but can work from time to time, he is paid his pension plus 10 percent of wages above base pay. Special allowances are made for dependent children. For temporary disability, a miner employed for over a year is paid his wages in full; for less than a year's service, he gets 60 percent of his earnings. Allowances to non-union members are half as much as those for union members.

Czechoslovakia

CZECHOSLOVAKIANS believe that their new miners' welfare scheme, introduced in 1948, is "the best of its kind in Europe." Taking the place of a less generous prewar plan, the new system covers every person in the mines from managers down and includes old-age and invalid benefits, pensions for widows and orphans, educational helps, marriage grants, medical dental, optical and hospital care and rehabilitation.

The plan is run jointly by miners, the union, management and the government. Changes are made by law or government decree. Underground miners, totaling about 87,000, draw bigger benefits than surface men, numbering about 37,500. Workers and employers contribute equally to the fund and the government makes up any deficit.

Retirement may come at age 55 after 35 years' service or after 25 years if underground, or at age 60 after 15 years, 10 of which must have been spent in coal mining. All workers must pay into the fund.

The Czech miner's average monthly pension, ranging from $42.40 up to $72, is geared to the length of time he has contributed to the fund. For example, on a base pay of $800 yearly, an underground miner gets a 53-percent pension after 10 years' service; from there, his pension moves up by stages until, after 30 years' service, he gets a 90-percent pension. A surface worker, with base pay of $640 yearly, gets a 47-percent pension after 10 years' service; by stages, this increases to 75 percent after 30 years and 89 percent after 40 years.

The minimum annual pension is $280 and payments are boosted 50 percent if the pensioner requires full-time care by another person.

Retired miners share free hospital and medical care with active miners. However, if an active miner is hospitalized, his wages stop and only his family gets an allowance.

For a look at how a retired Czech miner lives, take the case of Vaclav Kasal, age 75, and his wife Julie. On a monthly pension of $43 (raised in 1947 from $19.20), they live in a modest two-room house in a mining town not far from Prague. Food costs them about $16 a month and they pay $1.10 for rent.

Because old Vaclav retired 15 years ago, his pension is geared to the low wages paid at that time. If he had retired in 1948, he would be getting $90 to $108 a month. But his present $43 is so much more than his former pension that he is content. He is pretty well satisfied with his past, too. He became a miner at 15 and for 45 years never missed a shift and never had a holiday. Over the years, he has seen coal mining improve and miners' wages and benefits grow. Though he does not share all the benefits given younger men coming along now, he is glad they are better off.

The Kasal home is simple. It has electricity but no running water. Since Julie caught rheumatism 40 years ago, Vaclav has done the cooking and cleaning. He has saved money to buy a radio and an electric hotplate, but he figures he will not live more than 20 years longer and therefore might not get his money's worth of enjoyment from them if he bought them now. Vaclav and Julie go to the movies often and read a good many books but never bother with the newspapers.

Commenting on some of his friends who swear they never will go underground again, Vaclav admits that a miner's life in his day was tough but argues that there was none better. Even now, on his pension, he is doing all right.

France

IN FRANCE, the coal industry is going broke paying pensions and other benefits to its Communist-led miners. The scheme now in effect gives cradle-to-grave coverage. Started in 1947, when the government took over the coal mines after long urging by miners, the plan absorbed private social-security systems then in effect and enlarged the whole pattern to include universal pensions, hospitalization, rehabilitation, permanent disability payments, benefits to widows and orphans, medical research and social and recreational activities.

The upshot is that though the miners like what they have won, France's nationalized coal companies must pay $355.88 into the social-security kitty on the annual wage of every coal miner up to $868. The staggering total, for an industry mining only about 50,000,000 tons a year, is some $78,000,000. To the operator's $355.88, the miner himself adds only $86.80 and the government $53.44. Pointing to the industry's huge deficit in 1948, coal-mine managers argue that it was caused not by Communist-inspired strikes alone but also by the tremendous social-security burden the industry carried.

Broken down, annual contributions to the several funds are as follows:

	Workers	Companies	Government
	(Thousands of dollars)		
Sickness	$ 3,773	$ 7,546	None
Accident	None	18,870	None
Family helps	None	36,080	None
Pensions	15,092	15,092	15,092

A miner can begin getting his pension at age 55 after 15 years' employment. If he retires then, he draws half the maximum. The value of his pension increases for each year of service over 15 up to 30 years, when he is paid the maximum pension. Retirement is compulsory at age 60.

The average monthly pension is $27, roughly half of average earnings before retirement. A widow's pension is about half of what her husband's pension would have been, plus 30 percent of his allowance for each child. For total disability, maximum annual payment is $332. In case of partial disability, the company is required to make some kind of work available.

Pension-fund administration is on a national basis, but sickness, accident and family benefits are handled locally, regionally or nationally by joint councils including miner, management and government representatives.

To see how a retired French coal miner gets along, take the case of Louis Linglart, who retired in 1940 after digging coal for 44 years. He and his wife, Henriette, still live in the same house they moved into when they were married 30 years ago. It is one in a long row of identical four-room brick dwellings lined up along a narrow, muddy street. From the outside, it is pretty depressing but it is snug and clean inside.

Their pension comes to about $41 a month. Louis thinks that is enough, but Henriette, who does the marketing, thinks they need a little more. They eat all right, with meat every day, but Louis needs a new suit, which will cost a month's pension, and food prices are high. They stretch their budget a little with help from their miner sons and with a small garden in the yard.

Looking back at his own years in the mine, Louis contends that cutting coal is a miner's job, not talking politics, and he condemns the Communist-led miners' union and the way they sabotaged the mines in 1948. In his day, union policy was made from the bottom up; now it is from the top down.

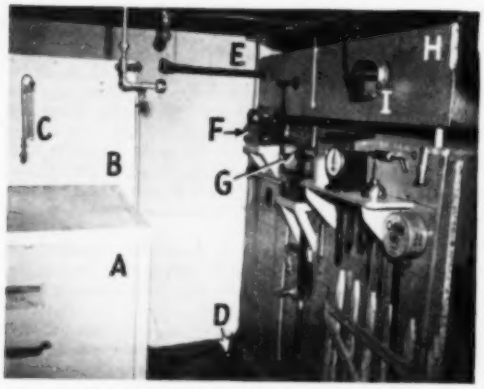
Thus, politics would keep Louis from starting work again in the mines if he were younger. He thinks he is doing all right. "We get the house, all our coal and medical attention from the company," he points out. "Haven't needed much help from the doctor yet, thank God. My lungs are full of coal dust, but there aren't any holes in them and they're still puffing."

Conclusions

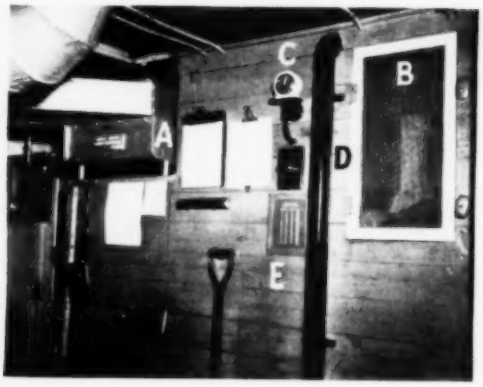
ADDING ALL THE FACTS TOGETHER, it is clear that coal miners, with special benefits from their own private schemes and extra helps from general social-security programs that put miners ahead of other workers, do pretty well in most foreign countries.

The fact remains, however, that not many coal miners abroad do as well as the American miner. If he gets sick or is hurt on the job, from his own welfare fund he draws $60 a month for himself, plus $20 for his wife and $10 for each child, in addition to ordinary workmen's compensation. He benefits by overall social security when he becomes 65 years old or if he loses his job. If he dies, his own welfare fund pays his widow a $1,000 death benefit. Just now, his welfare fund is setting up hospital and medical care for miners and their families on a regional basis. Finally, when he reaches age 62, if he has worked in the mine for 20 years, he draws $100 a month from his pension fund—about one-third of the average American miner's earnings. That's not bad. It's better than miners do almost everywhere else.

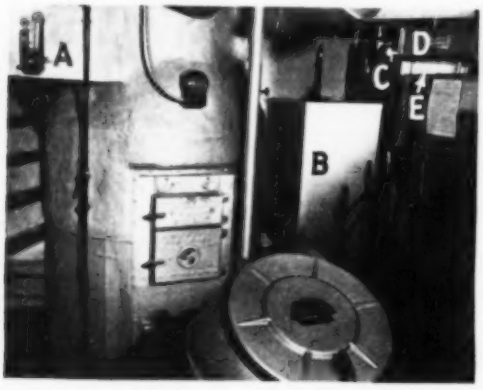
Careful Study and Home-Designed Equipment Achieve Results In . . .



HEATING PLANT DETAILS: fan housing (A), filter housing (B), water gage to indicate pressure drop through filter (C), motor for pump circulating water through the filter (D), thermocouple at chimney end of economizer (E), indicating mater which can be switched to two thermocouples (F), draft gage (G), flue-gas economizer with spaces around it for air circulation (H), and safety temperature device to stop stoker if overheated (I).



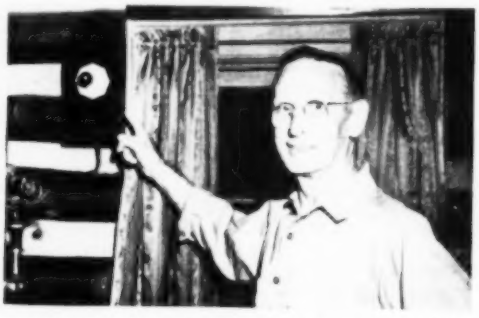
HEATING PLANT DETAILS: flue-gas economizer (A), opening (B) into the coal bin to permit some of the air in the room to move into the coal bin and out another screened opening to circulate around the economizer before entering the filter on its way to the furnace, electric clock totaling minutes per day the stoker operates (C), pipe from vacuum cleaner to bag hung in coal bin (D), and framed table of coal weights per minute of stoker operation (E).



IMPROVEMENTS WERE MADE around the original furnace and stoker. Auxiliaries include: water gage on wind box (A), air circulating fan (B), filter (C) and flue-gas economizer with clean-out door (D). Space for air circulation (E) is provided between the economizer and the cover over a section of the coal bin.

VACUUM DUST COLLECTOR promotes cleanliness. Any dust from coal shoveled into the stoker charging bucket in front of the coal-bin outlet is caught in the suction of the vacuum-cleaner fan immediately above it. Clinkers are crushed in the same bucket for easier disposal and the dust is similarly trapped.

COAL CONSUMPTION during the first six years at Fulleridge is shown in this framed chart on the basement wall.



INDICATING LIGHT in the corner of the living room, to which Mr. Fuller is pointing, shows when the stoker is operating.

NOW HEATED WITH LESS THAN ONE-FOURTH THE COAL originally required, the main part of the Fuller residence is 28x28 ft. The heating plant is under the 16x20-ft. wing, with the furnace chimney at the extreme left.

Improving Coal Heat

Fulleridge Coal Consumption Cut From 13.3 to 2.9 Tons a Year With the Original Furnace and Stoker—Smoke Is Practically Eliminated — Fly-Ash Trapped — Comfort, Convenience and Cleanliness Greatly Improved

USING THE ORIGINAL furnace and stoker, Claud E. Fuller, retired ceramic and mechanical engineer and author, who resides at Fulleridge, near Chattanooga, Tenn., has reduced his coal consumption 79 percent, with a marked increase in home comfort as a result of a serious study of heating-plant operation. His heating bill with coal is now so low and he needs handle so little coal and ashes that it would take more than a super-salesman in the competing-fuel field to persuade him to make a change. His improvements to the heating system include filtering and humidifying the air, trapping fly-ash and cooling the house during the summer.

When Mr. Fuller retired in 1933, he decided to move out of New York City and establish a modest home in the country. For this he purchased a 50-acre tract on a high wooded ridge 13 miles from Lookout Mountain with, however, a distant view of the scene of "The Battle Above the Clouds" of the Civil War. In 1933 he built a one-story rustic-type residence and heated it temporarily with open-grate fireplaces. In 1935, he installed a 24-in. Peerless hot-air furnace with an Auburn coal stoker.

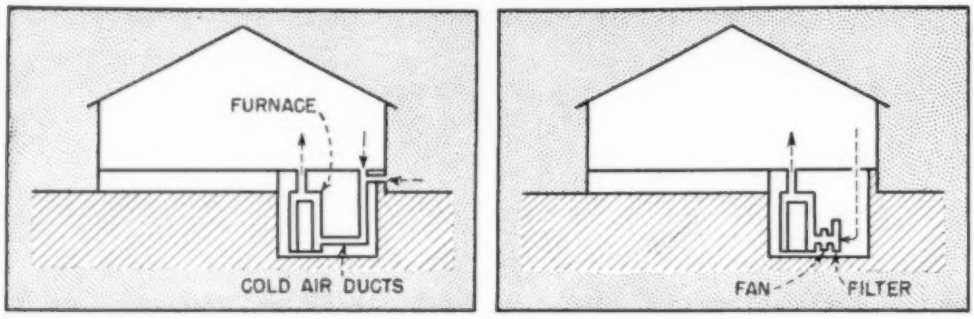
As an urban dweller, he had lived in apartments and had never owned a house. Therefore, this was his first experience with a residential furnace. Characteristic of his training, experience and natural yearning for orderliness and efficiency, he set out to learn everything he could about operation of the furnace and stoker. His investigation and experimentation were not hampered by any lack of instruments for making tests, inasmuch as he had brought with him to Fulleridge the pyrometers and other test instruments and tools formerly used in his engineering work.

During the heating season of 1935-36 he operated the furnace and stoker as nearly as possible in accordance with the manufacturers' instructions and recorded every day the weight of coal put into the stoker hopper, the outside temperature, wind direction and other weather data. The coal consumption for the heating season of 190 days during 1935-36 was 13.3 tons, and the house was far from comfortable a lot of the time.

Floor dimensions of the main building are 28x28 ft. and of the wing 16x20 ft. The roof sheathing, planed and stained, is the ceiling of the 14x28-ft. living room and the ceiling height from floor to gable is 20 ft. All outside walls are insulated with mineral wool but the insulation planned for the roof or ceiling has not been installed. During the first heating season the furnace had the conventional hot- and cold-air ducts, including a controlled intake to the outside, and at that time there was no fan to start air movement or aid the natural circulation.

The first step in a series of changes that finally cut coal consumption per season to a low of 2.9 tons was the elimination of the return cold-air ducts, elimination of the controlled cold-air intake from the outside, installation of a circulating fan, and utilization of the basement furnace room itself as a part of the air-circulating system, thus conserving the heat radiated from the furnace casing and from

Better Air Circulation Among Steps to High Heating Efficiency



AIR-CIRCULATION CHANGE a major factor in improved results. The left diagram shows the original system; the right, the present system making furnace room part of the circuit. Flue pipe and flue-gas economizer are not shown.

TABLE I—Thirteen-Year Heating Record for the Fulleridge Residence

Heating Season	Coal Used, Tons	Furnace Firing Period, Days	Avg. Lb. Coal Burned, per Day	Ash Carried Out, %
1935-36	13.3	190	139	..
1936-37	4.6	174	53	..
1937-38	4.4	188	47	..
1938-39	4.6	201	46	..
1939-40*	5.0	186	54	2.5
1940-41	4.1	160	51	3.0
1941-42	4.0	165	49	3.4
1942-43	3.1	179	35	4.0
1943-44	3.3	182	37	5.6
1944-45	2.9	165	35	5.9
1945-46	3.0	177	34	8.2
1946-47	3.8	189	40	6.8
1947-48	2.9	154	39	11.0

*Coldest season on record in the vicinity since the government weather bureau was established.

TABLE II—Fulleridge Operating Data Includes This Sample From the Top Part of a Loose-Leaf Record Sheet Hung on the Furnace Wall and Posted Each Day

Day and Date	Days This Season	Coal, Lb.	Coal This Mo., Lb.	Coal This Season, Lb.	Temp. Outside	Wind	Weather	Remarks and Percent Ash This Season
Mon., 16	66	0	690	1,950	36	VL-E10SE	Cloudy	
Tues., 17	67	0	690	1,950	32	VL-S20E	Cloudy	
Wed., 18	68	150	840	2,100	29	M-N10W	Clear	Ice on upper B.B.
Thurs., 19	69	0	840	2,100	25	L-N20W	Clear	115 ÷ 2,100 = 5.4 ash
Fri., 20	70	0	840	2,100	33	VL-N30W	Rain	
Sat., 21	71	90	930	2,190	35	VL-S30W	Clear	
Sun., 22	72	120	1,050	2,310	26	L-N10E	Clear	131 ÷ 2,310 = 5.6 ash

Sheet No. 4.
December, 1946 (continued from Sheet No. 3).
Weight of ashes this season, carried forward from Sheet No. 3, 96 lb.

the flue pipe between the furnace and chimney. This resulted in increasing the temperature of the circulating-system intake from an average of 45 deg. to an average of 85 deg., with the outside temperature ranging from 35 to 39 deg.

These first changes saved approximately 9.7 tons of coal, assuming the weather for the comparative heating seasons as averaging about the same. But in spite of using dustless-treated stoker coal and exercising considerable care in removing clinker and ashes, the new circulating system carried considerable dust from the basement into the house.

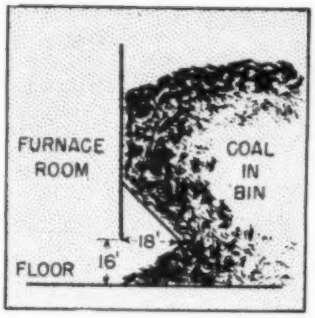
Conquering that and, in fact, reducing the house dust far below the level achieved with the original installation was accomplished by adding to the intake side of the fan a filter consisting of a 4x4-ft. wall of wood excelsior 5 in. thick above a 15-gal. water pan or sump, the latter kept filled by an automatic valve and float. A very small centrifugal pump driven by a 1/6-hp. motor can be turned on to wet the excelsior occasionally or to keep water dripping through it. The material for building this filter consisted of a pump from a washing machine, a burned-out motor, some galvanized iron, hardware cloth, screws, pipe and fillings, at a cash outlay of $16.50.

Filtering not only cleans the air but humidifies it, thus eliminating the bother of keeping water pans filled. Mr. Fuller states that for this purpose excelsior is much better than glass or mineral wool because, with one wetting by short-time operation of the pump each morning, it absorbs about the quantity of moisture required in the house during the 24-hour period.

On hot days, the centrifugal pump, filter and circulating fan of the heating system are used for cooling. This system of cooling without wasting water is reasonably effective except on days of high humidity. On a dry, hot day a maximum cooling has been 12 deg.

During the heating season the stoker is charged at 7 a.m. each morning, at which time the coal is weighed and the weight of coal, outside temperature, wind direction and velocity are recorded on a loose-leaf data sheet on the basement wall. Clinker and ash are cleaned out at the same time, but are stored in a bucket and not weighed until the bucket is full and carried out of the basement. At noon each day, wet- and dry-bulb temperatures, the barometer reading, precipitation and wind direction and velocity are recorded. These morning and noon records are practically complete for the thirteen past heating seasons.

At least five different stoker coals from Kentucky mines have been used with satisfaction, but Mr. Fuller says he has experienced difficulty in getting from the dealers duplicates of coals he found superior. Over the years, the total clinker and ash carried out of the basement during a heating season has ranged from 2.5 to 11 percent of the weight of the coal consumed. To combat the dust nuisance, especially bad during the period when treated coal was not available, a vacuum cleaner was permanently installed at that point in the basement where the coal and ashes are handled.



HOOD ON THE INSIDE OF THE BIN prevents coal flowing out on basement floor.

An electrical pyrometer installed in the furnace pipe showed flue-gas temperatures as high as 750 deg., resulting in tremendous loss of heat up the chimney. The next step conserved about half this heat and at the same time provided a means of trapping a large part of the fly-ash. A flue-gas economizer box was installed in the flue pipe between the furnace and chimney. The box, having a much larger surface than the original flue and slowing the gases down, radiates a much greater percentage of heat to the basement than the original flue pipe, thus preheating the return, or cold air, immediately before it is pulled through the filter and forced through the furnace. Now, as a result, the flue-gas temperature rarely exceeds 350 deg. F. as it enters the chimney.

Fly-Ash Removed

The fly-ash is periodically removed from the economizer box through an airtight door provided for that purpose. There is a deep well on the property but its capacity is small. Consequently, water must be conserved. Since rain water is ideal for most of the household uses, it is caught from the roof and stored in an underground cistern. Trapping much of the fly-ash, and thus preventing its settling on the roof and contaminating the soft-water supply, is a distinct advantage. Although high-volatile coals are used, the automatic stoker controls the fire so well that black smoke seldom, if ever, issues from the chimney.

How much of the credit for a further reduction of coal consumption to the minimum of 2.9 tons per season can be credited to the flue-gas economizer is difficult to determine because of a coincident change to reduce excess air for combustion. A water gage is permanently installed to register pressure on the stoker wind box and, in accordance with recommendations, the pressure was at first maintained at $1\frac{1}{2}$ in. Experimentation revealed that this pressure could be reduced to $\frac{1}{2}$ in. and still insure good combustion.

Other test instruments permanently installed comprise a draft gage on the economizer and an electric clock that totals the time the stoker operates each day. After it is read at 7 a.m. each morning, the clock is set back to 12. A switch in connection with the indicating instrument of the electric pyrometer permits it to be switched to flue gas thermocouples in the furnace outlet and far end of the economizer.

The Airstat of the conventional stoker control is set to stop the stoker when the temperature of the circulating air in the furnace reaches 300 deg. It resets when the temperature drops to 280 deg. As an additional safety precaution, an extra Airstat on the flue-gas economizer stops the stoker if the flue gas reaches 500 deg. at that point. The thermostat in the living-room of the house usually is set to maintain a room temperature of 75 deg. between 7 a.m. and 10 p.m. and 55 deg. during the night.

While most of the stoker installations in the vicinity are operated with wind-box pressures of $1\frac{1}{2}$ to 2 in. and drafts of from 0.3 to 0.45 in., experience at Fulleridge has shown that best results on most coals are secured with a wind-box pressure of 0.5 in. and a chimney draft of 0.15 in. With that adjustment, proper combustion is obtained and, if the "Hold Fire" control is set for running the stoker one minute each hour, the fire is seldom lost. As compared with a setting of $2\frac{1}{2}$ minutes every 30 minutes, this effects a considerable saving in fuel.

On those rare occasions when the fire is lost, another innovation comes into play. In place of the usual pile of paper and kindling, with its resultant mess and fire hazard, the "tinder" is kept in two 1-gal. paint buckets with the ordinary pressed-on lids and hung up out of the way. This "tinder" consists of sticks of wood about $\frac{3}{4}$x$\frac{3}{4}$x7 in. soaking in coal oil. Four or five of these sticks with a little coal on top will start a fire with any coal.

To trap the dust, the motor and fan from a household vacuum cleaner are mounted on a low shelf on the wall of the coal bin so that the air intake is a few inches higher than the top edge of buckets set on the floor to receive coal and clinkers. The discharge pipe extends to the top of the coal bin and is connected to a vacuum-cleaner cloth bag hung inside the bin. The total cost of this arrangement was $2 for an old vacuum cleaner and 50c. for the conductor pipe and shelf bracket.

The hole through which coal is obtained is hooded on the inside to keep the coal from running out on the floor beyond the line of the bin wall. When coal is shoveled from it into a bucket, set close by, any dust is caught in the cleaner bag. Clinkers taken out of the furnace each day are crushed into a clinker bucket, likewise positioned under the cleaner intake. The reason for the crushing, done with a wooden tamper, is to reduce the space occupied by the ashes so they need not be carried out of the basement as frequently.

Detailed Records Kept

A framed table mounted on the wall conveniently near the daily record sheets shows the pounds of coal fed by the stoker for operating times from 1 to 60 minutes. The clock and this table are used each day as a check against the weighed coal put into the stoker magazine. Actually, each bucket of coal is not weighed. Instead, occasional buckets are weighed as a check against the weight figure used per bucket.

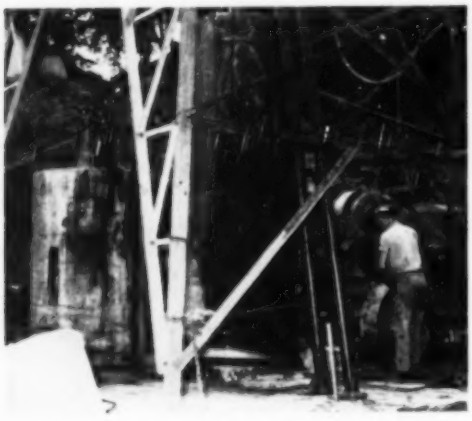
Handling an average of only 35 lb. of coal per day, compared to 139 lb., and having ash accumulate at a rate of only 2 lb. a day instead of 8 (assuming 6-percent-ash coal) has saved Mr. Fuller a lot of labor. Considering the other advantages of greater comfort, a house freer of dust and the large savings in fuel bills, he is being well repaid for his effort. Because of his engineering mind and a passion for order and efficiency, it may be an error to call it effort—for him it was play.

As a hobby, Mr. Fuller years ago became a student and collector of American military shoulder arms. On various phases of that subject he has written four comprehensive books, which the publishers market to gun collectors all over the United States. He is making arrangements to give his collection of 485 different pieces—most in fine to mint condition and housed in a separate building near his residence—to the U. S. Government for permanent display at Chickamauga National Park as the Claud E. and Zenada O. Fuller Collection. His wife, Zenada, shares his interest in the guns and helped in the writing.

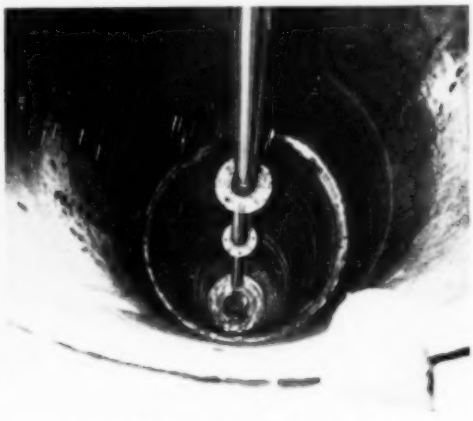
Cost of Improved Ventilation and Modern Escapeway Reduced by . . .

SITE OF THE NEW DRILLED SHAFT, showing 4-ft. shell 20 ft. long used from the surface to bedrock.

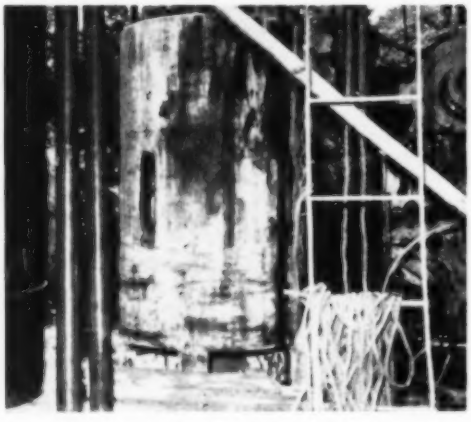
STEEL SHELL IN PLACE with workman spreading concrete on the rock to provide a level drilling surface.



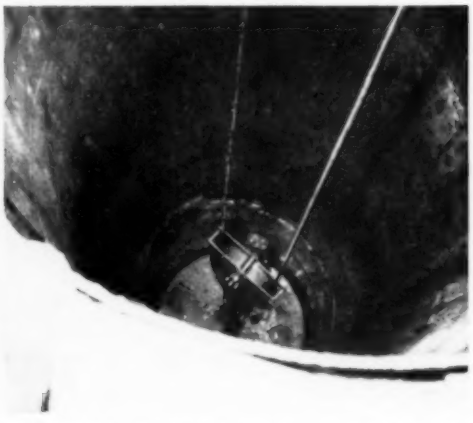
DRILL CYLINDER ready for lowering into the shaft.



DRILLING HEAD in action at a depth of 105 ft.



CORE LIFTER being lowered into the shaft to pick up the solid core of rock cut loose by the core barrel.



CORE LIFTER breaking the surface of the water in the shaft with a core segment 48 in. in diameter.

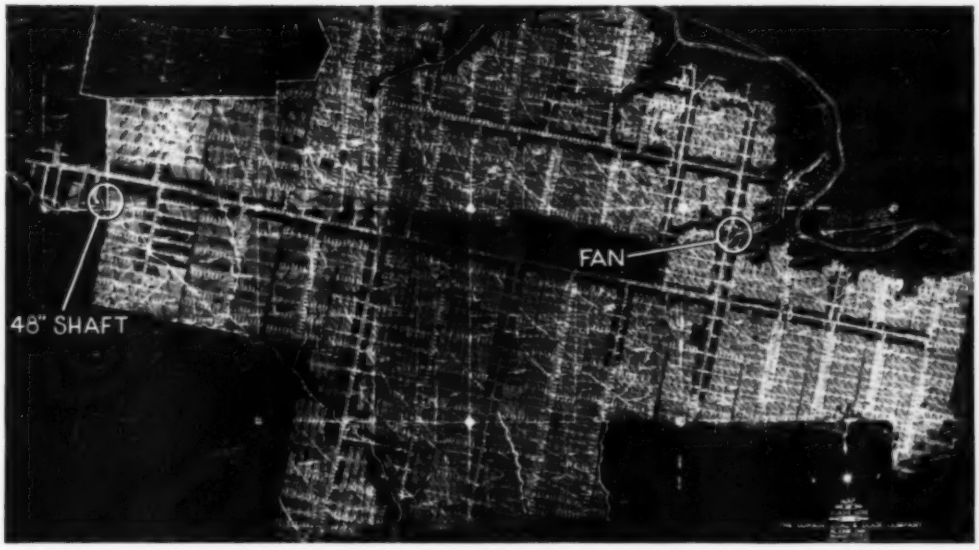


FIG. 1—SUNK SOME THREE MILES from the main portal, the new core-drilled shaft provides a nearby escapement with a substantial improvement in air volume and mine water gage.

Shaft Sunk by Core Drilling

Emergency Escapeway Provided by 48-In. Core-Drilled Shaft at One-Tenth to One-Eighth the Cost of a Conventional Portal—Increased Air Volume Made Possible With a Substantial Reduction in Water Gage

By PAUL T. PORTER
Chief Engineer, Lorain Coal & Dock Co., Blaine, Ohio

A 48-IN. CORE-DRILLED SHAFT recently sunk at the Blaine mine, Lorain Coal & Dock Co., Blaine, Ohio, intersects advancing entries 202 ft. underground and provides a nearby escapeway for men working three miles or so from the portal. In addition to insuring quick escape for workers in case of fire or other emergency, the new shaft improves ventilation inside the mine.

Since 1910, when the Blaine mine first was opened, it has produced 3,000 to 4,000 tons daily from the Pittsburgh, or No. 8, seam. The mined area, therefore, is extensive. The property stretches about 3½ miles from its eastern side, where operations began 38 years ago, to the western property line.

With the acquisition of additional property on the western side about 18 months ago, the management realized that an additional escapeway should be provided closer to the working faces. Investigation of costs and prospective locations for the new opening indicated that core-drilling a new 48-in. shaft would cost about one-tenth to one-eighth as much as a new portal with conventional dimensions and facilities, whether of the shaft or slope type.

Cost studies indicated further that the savings in travel time for miners would not offset the expense of a new portal when measured against the relatively small outlay required for a smaller core-drilled shaft, 48 in. in diameter. Accordingly, a contract for a core-drilled shaft of this size was drawn up between the Lorain Coal & Dock Co. and the Pennsylvania Drilling Co., Pittsburgh, Pa. The contractor moved his equipment to the proposed site about April 15, 1948, after the mining company already had started development of entries toward the proposed shaft.

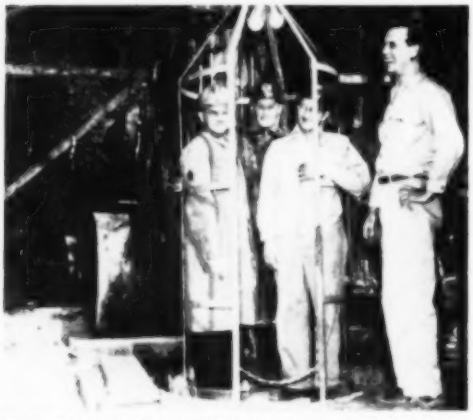
Since actual core-drilling starts only at bedrock, unconsolidated materials from the surface down to bedrock must be removed by manpower. When bedrock is reached, a steel shell is lowered into the hole and the annular space outside the steel shell is filled with concrete from the rock up to the surface. Thus a perfectly level concrete base is provided for the core-drilling machine. This level base is needed because shot is used as a cutting medium.

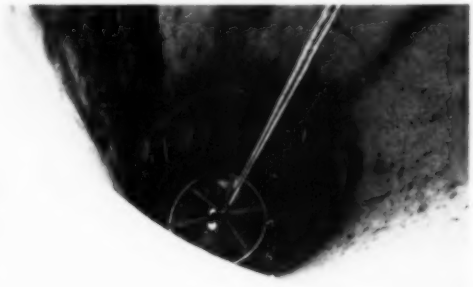
Actual drilling was started about May 10. Cave-ins and water springs encountered were sealed off by special methods developed by the Pennsylvania Drilling Co. Because this was the first of its size to be drilled into a coal mine and because little was known of the structure of stone and other materials overlying the

Shaft Facilities Provide Maximum Protection for Personnel

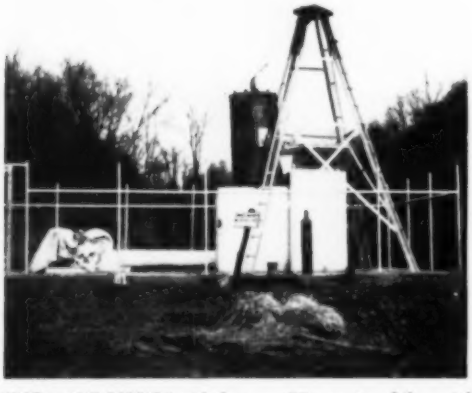
CORE SEGMENT dropped out of the lifter onto a platform ready to be hauled away to the dump.

THREE CORE SEGMENTS brought up in one day of operation in drilling the 48-in.-diameter shaft.





READY TO INSPECT COMPLETED SHAFT—E. G. Schell (left), Lorain general manager; Frank Sturges, Pennsylvania Drilling Co.; and the author. The 36-in. cage made especially for the purpose is shown 65 ft. down in the shaft at the right.



PORTAL AND DERRICK, with the cage sitting on top of the portal. An 18-in. steel tube connects the fan and portal. The steel doors at the top of the portal are normally open, but are closed if the shaft is being used as an escapeway.

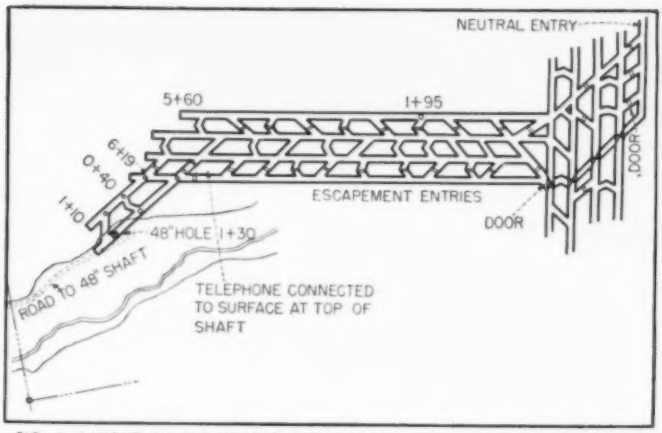


FIG. 2—LAYOUT OF ESCAPEMENT ENTRIES at the new core-drilled shaft. The shaft becomes an independent airway, when needed, by diverting the return air.

coal, work proceeded rather slowly at times. In addition, some of the cores did not break as desired or split into segments laterally or diagonally. In these cases it was necessary to lower a man into the hole either to trim the core so that the core lifter could grasp it or, if the material was unconsolidated or of such composition that it could not be lifted by the hoisting mechanism, to blast and load it out manually. In spite of obstacles like these, however, the shaft was forced through into the mine on Oct. 9, a total distance of 202 ft.

The smooth-cut rock wall made it unnecessary to line the drilled part of the shaft. The only wall treatment required was the grouting off of water and the sealing off of several weak fireclay beds. These latter were taken care of by reaming the shaft to a larger diameter at those points where fireclay was encountered and then pouring a ring of cement that was left flush with the shaft wall.

As stated earlier, the entries leading to the proposed shaft were started a good while before drilling began and were finished well ahead of the drilling. Since it was not known at the beginning whether the new opening would be a shaft, a slope or the 48-in. hole, four entries were driven abreast to allow for possible portal needs—mantrip cars, supply tracks, proper ventilation and a natural aircourse entry for a manway escapement. Total distance from the main haulage entries to the proposed new opening was about 600 ft., about 450 ft. of which had been driven when the contract was signed for the 48-in. shaft.

Since the relatively narrow shaft eliminated any need for portal facilities, two of the four entries were stopped. The other two were driven the remaining 150 ft. at an angle of about 45 deg. leftward to the point where the shaft would enter the mine. This plan was laid out in advance to provide a better method of taking care of men coming into the escapement entry in case of emergency.

Normally this 48-in. shaft will be used as a partial exhaust of the mine's ventilating air current. However, its primary purpose was for use as an emergency escapeway for miners. This meant that some way had to be found for directing exhaust air away from the manway entry. This has been done by making an airlock just out by the point where the two entries were turned to the left. The inner door of the airlock is close to the turn. Inside the airlock is a device which permits the men to close either one or both of two doors in the return air course without exposing themselves to noxious gases, smoke or foul air. The course of the return air thus is changed to the outside and the shaft becomes an independent airway.

In addition to the escapement entries, another entry was started and will continue to be driven on the right side of the main haulageway entries. This is to be used as a neutral manway escapement, with entrances provided approximately every 300 ft. This entry is connected by incombustible overcasts across the main west entries to the airlock near the bottom of the new shaft. It is believed that in most emergencies this neutral entry would permit nearly all workers to travel safely to the bottom of the new shaft or to the airlock, where they could wait until standby facilities at the top of the shaft could be placed in operation.

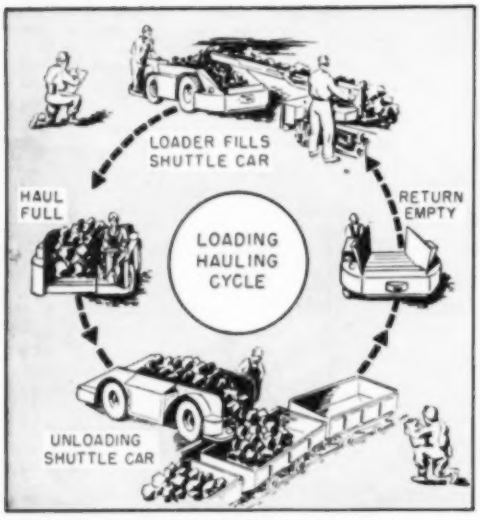
Topside standby facilities at the new shaft include a circular steel-casing bullet-shaped cage connected to a permanently fixed derrick and hoist rigging powered by a gasoline engine. On the surface, men enter the steel cage by first opening the door to a steel portal welded to a steel cylinder which is connected to the shaft. From this portal they enter the cage through a circular sliding door, thus being completely enclosed when the cage is lowered or raised. The surface structures rise about 15 ft. above the ground level.

An emergency fan capable of producing about 10,000 c.f.m. is directly connected to the hoist-engine shaft. Air is blown through an 18-in. tube connected to and opening through the side of the steel casing. The fan can supply fresh air either to the men at the bottom or to rescue crews, and it operates continuously whenever the cage is in motion. The cage will carry six to eight men on its single deck.

Ventilation Markedly Improved

As stated earlier, the new shaft was drilled primarily as an emergency escapeway but it also has been found to have considerable effect upon mine ventilation. For example, out of 84,000 c.f.m. produced by the main fan, 50,400 c.f.m. is exhausted through the 48-in. shaft by a natural split of the total ventilating current, causing the water-gage reading of the entire mine air to be reduced $1\frac{1}{4}$ in. Likewise, whereas the main fan produced only 71,188 c.f.m. 400 ft. from the fan prior to sinking the new shaft, it now produces 82,400 c.f.m. at the same point. At 12 South, some two miles from the fan, where former air readings indicated 52,125 c.f.m., air now is produced at the rate of 70,090 c.f.m. Three miles from the fan, at 17 South, where the first major split of air occurs, air volume has increased from 13,200 to 15,950 c.f.m.; and at 21 North, from 13,200 to 19,800 c.f.m.

Since shafts like this cost relatively little compared to a new portal, and since they improve ventilation and provide emergency escapeways within reasonable distance of the working places, it is believed that more of them will be used in the future.



KEY FACTOR IN PENN-STATE TIME-STUDY SYSTEM—two or more observers, using synchronized watches, spotted at strategic points to note all operations and delays. Observers first thoroughly study the method and learn the 15 symbols shown at the far right.

Time-Studying Shuttle Cars

New Penn-State Method Is Designed to Bring Out More Clearly Major Delays in the Loading and Hauling Cycle With Shuttle Cars and Point Out Through Method and Production Studies Where Improvements Are Possible

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THE TIME STUDY METHOD developed at Penn State College was applied to loading and hauling in coal mines because these operations account for 33% of production costs. The purpose of the time study method is to put the finger on loading and hauling costs and to reveal remedies which will increase productivity and profits. Attention was directed to shuttle-car loading, because more than 3,000 of these units are in use in mines in this country.

Most production studies will tell how much better one section of a mine performs than another, but less frequently do they tell *why*. This is because usual systems of measurement do not take into account three vital elements of a working section—*men, machines and layout*. Another weakness of some methods is the failure to study a complete cycle. For instance, loading time is meaningless unless studied as a component of an overall loading-hauling cycle where haulage delays may contribute to loading delays.

Thus, this method combines (1) a time study of loading and gathering cycles; (2) a method study that examines mine layout; and (3) a production study by which you can rate your sections as to efficiency. The time-study method presented here is applied to shuttle-car production units which generally include a mobile loader, one or more shuttle cars, a drill and a cutting machine. Slight modifications permit using this method for other mechanical units.

The general procedure is as follows: One observer is stationed at the loader; another at the discharge station. Both keep a time record, and note all loading and gathering activities within their scope of observation. This gives a complete continuous time record of the loading and gathering cycles for later analysis.

An accurate map of the section is used on which are noted shuttle car routes and passing points. Distances are scaled from the map so shuttle-car mileage can be figured. This map is helpful in planning better section layout.

Statistics of the number of men, machines and production achieved are obtained from mine records. These data are used with the time and method study data to calculate ratings for production units.

Chief object of the study is to determine productive time, necessary

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FIELD FORM A THE PENNSYLVANIA STATE COLLEGE
MINERAL INDUSTRIES EXPERIMENT STATION

TIME STUDY OF LOADER AND SHUTTLE CAR

MINE	SECTION	DATE	FIRST PLACE WORKED	OBSERVER
840	841-A	6-5-48 SHIFT 2		I.N.H.

SHUTTLE CAR NO. 1			SHUTTLE CAR NO. 2			REMARKS	SHUTTLE CAR NO.		
Symbol	Observed Continuous Time	Working Time	Symbol	Observed Continuous Time	Working Time		Symbol	Observed Continuous Time	Working Time
ST	00 00		ST	00 00		STARTING TIME 08.00			
DM_S			PC	09 10		TO 45 FACE			
			L	11 25					
			I>			LEFT ON TRIP No.1			
			TE	17 45					
			L	18 95					
			2>			LEFT ON TRIP No.2			
			TE	23 70					
			L	25 45					
DM_S	30 00		3>			FIX FLAT TIRE			
TE	31 10		TE	31 00					
WO			L	31 55					

L—Loading Time
M—Maneuvering Time
TE—Traveling Empty
TL—Traveling Loaded
D—Discharging
WO—Waiting for Other Car
DL—Delays in Loading
HS—Handling Supplies
PC—Place Change
DM_S—Delays, Mechanical—Shuttle Car
DM_L—Delays, Mechanical—Loader
DS—Delays at Discharge
DP—Delays—Face Preparation
DN—Delays—Natural Conditions
DO—Delays, Other

FIELD FORM A USED IN THE PENN-STATE SYSTEM. The symbols (right) are used in recording significant loader and shuttle-car operations in the field, along with "Observed Continuous Time" and "Remarks." "Working Time" is computed later.

delays, and unnecessary delays. To gather data to evaluate these items, observers must fill out standard forms in shorthand. Field Form A (see illustration) is used to record nearly everything that happens in a section, and each activity is described by an easily-learned symbol. These symbols are:

TKZ—Total Productive Time. This is the part of the shift during which a machine actually does productive work. TKZ is a summary of the five following elements:

L—Loading Time. The time consumed when the shuttle car is under the boom of the loader, receiving coal.

M—Maneuvering Time. Movement of the loading machine or shuttle car or both while at the face, which is necessary for loading. During this movement no coal is loaded.

TE—Traveling Empty. Movement of the empty shuttle car over normal travel route from the discharge station to the loading machine.

TL—Traveling Loaded. Time used by the shuttle car in traveling with a load of coal from loader to discharge station.

D—Discharge Time. Time during which discharge conveyor of shuttle car is running, transferring the load to another carrier or to a bin.

Important — The five symbols shown above do not account for any *delays* that occur while loading, maneuvering, traveling, or discharging. All delays have their own special symbols listed below. Men making the study must record each delay separately with the appropriate delay symbol.

TND—Total Necessary Delays. Time when the machine being studied is not producing, but is engaged in unproductive work, or is delayed by operations that are a necessary part of the section conditions. TND includes the following four time elements:

WO—Waiting for Other Car. The time the shuttle car is standing by waiting for other car to pass.

DL—Delays in Loading. Any delay that prevents the loader from loading while coal is available and the shuttle car is ready to receive it. Included are: timbering, testing for gas, testing roof, breaking lumps, gobbing rock, digging face.

HS—Handling Supplies. Time consumed in any shuttle-car handling and movement of supplies such as timber, rock dust, bits, tools, parts.

PC—Place Change. Time consumed in moving from one working place to another. Included are: tramming, handling cable. Note—all delays en route are recorded with appropriate symbols.

TUD—Total Unnecessary Delays. Time during which the loader or shuttle car is not engaged in production, because of delay that is considered unnecessary. TUD includes the following six time elements:

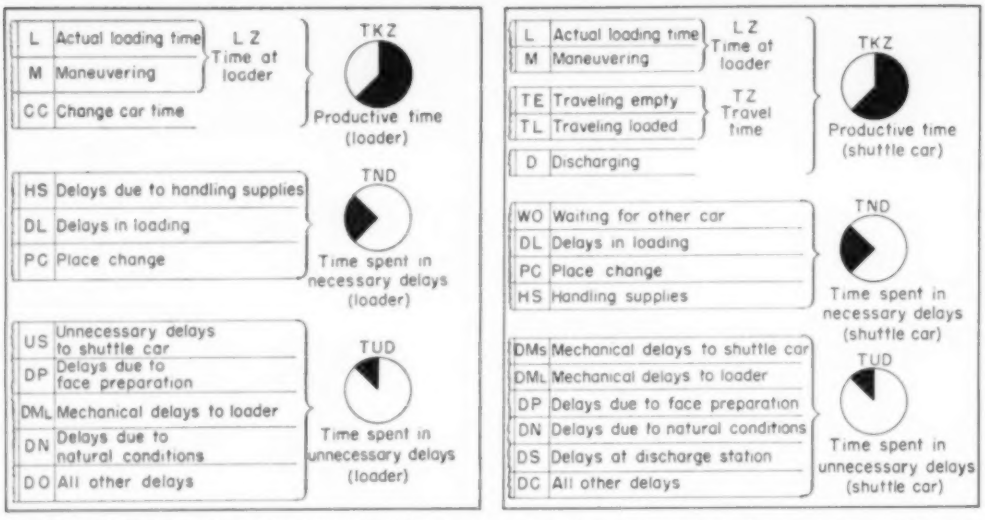
DM_S—Delays, Mechanical—Shuttle Car. Time during which the shuttle car is removed from production by a mechanical delay. Included are: battery failure; cable failure; mechanical or electrical breakdown within shuttle car; battery changing; lubrication.

DM_L—Delays, Mechanical—Loader. Time during which the loader is unable to operate because of a mechanical failure. Included are: mechanical or electrical breakdown within loader; failure of cable; lubrication.

DS—Delays at Discharge Station. That time during which the shuttle car is ready to discharge but is prevented from doing so. Included are: belt stoppage; car spotting; no empties; belt loaded inby; failure of auxiliary discharge equipment.

DP—Delays in Face Preparation. Time consumed while the unit is delayed by the preparation crew. Included are: waiting for drilling, cutting and shooting to prepare an immediate place; shooting adjacent places.

Time Studies Spot Production Delays and Indicate Remedies



LOADER AND SHUTTLE-CAR TIME-STUDY SUMMARIES (left and right) enable management and production men to correct time-consuming non-productive delays in the loading-hauling cycle. "Total Unnecessary Delays" obviously deserves the closest scrutiny.

DN—Delays—Natural Conditions. The time consumed by a delay due to bottom or roof conditions. Included are: roof falls; roadway maintenance; rough or muddy bottom; upheaval of bottom; subsidence of roof.

DO—Delays, Other. All delays not mentioned above are placed under this category. When filling out field forms, each DO item requires a note in the "Remarks" column. Included are: lunch; ventilation; other equipment failures; power failure.

Observers are instructed to record each activity of the loader or shuttle cars by writing in: (1) The proper symbol, and (2) The "observed continuous time." This is the watch reading at the *completion* of each recorded activity. "Working time" column on the forms used is left blank. Working time is computed later. Both observers start their watches at the same instant with a reading of 00.00. Watches are then allowed to run without interruption until the time study ends.

In planning a time study, observers are required to study a standard field procedure and sample field forms. Observation points are carefully selected. The precision desired in the time study is determined beforehand. A freshly posted map is obtained and studied. General information regarding the section to be studied is recorded on standard forms.

After observations have been made and recorded, the completed field study must be summed up to give useful information about section efficiency. Time-interval symbols shown below are used to condense the mass of time-study data from Form A. Data is arranged for analysis as follows:

CC—Change Car Time. Time during which the loader is ready to load but the shuttle car is absent, doing other productive work. Delays that keep the shuttle car from returning to the loader in a normal time are not counted as part of CC.

In a single shuttle car system,

$$CC = TL + D + TE$$

In a multiple-car system, true CC must be calculated by subtracting all delays that affect the normal return of the shuttle car to the loader. A summary form is used to make this task simple; CC is used in summing up loader operations.

US—Unnecessary Delays to Shuttle Cars. Total unnecessary delays preventing shuttle car from returning to loader. Such delays increase the apparent CC time but must be subtracted from it to obtain the true CC time. US includes DMs, DS, DN and DO of the study. But it includes these delays only in so far as they affect the prompt return of the shuttle car.

$$CC + HS + US = \text{Apparent CC}$$

LZ—Total Loading Time. Time during which the shuttle car and loader are in position at the face engaged in the work of loading the shuttle car. LZ is used in summing up loader and shuttle-car operations.

$$LZ = L + M$$

TZ—Travel Time. Time spent by the shuttle car traveling in the production cycle. TZ is a shuttle car summary item.

$$TZ = TL + TE$$

Total Productive Time. That part of the shift during which the machine being studied does productive work. TKZ is used to sum up both the loader study and the shuttle car study.

In the loader study,

$$TKZ = LZ + CC$$

In the shuttle car study,

$$TKZ = LZ + TZ + D$$

Total Necessary Delays. That part of the shift during which the machine being studied is not producing, but is engaged in unproductive work or is delayed by operations that are a necessary part of the section conditions. TND is a summary item for both loader and shuttle car.

In the loader study,

$$TND = HS + DL + PC$$

In the shuttle car study,

$$TND = WO + DL + PC + HS$$

Total Unnecessary Delays. That part of the shift during which the loader is not engaged in production, because of a delay that is considered unnecessary. TUD is a summary item for both loader and shuttle car.

In the loader study,

$$TUD = US + DM_L + DP + DN + DO$$

In the shuttle car study,

$$TUD = DM_S + DM_L + DP + DN + DS + DO$$

TYZ—Total Shift Time. The time that is spent in the section. TYZ for the loader is of course the same as TYZ for each shuttle car. But the separate time intervals that make up TYZ are different for the loader than for the shuttle cars. That is why the loader and shuttle car operations must be summed up separately.

> **Note**—*The groupings under TND and TUD are somewhat controversial. Some delays in each group may be placed in the other, according to the individual view of mine management as to whether the delays are "necessary" or "unnecessary." The groupings given here were set up to cover many mines.*

The foregoing discussion merely outlines important features of the time-study method. Many details and illustrations of forms have been omitted, but they will be made available to interested readers as explained at the conclusion of this article.

As mentioned, the Penn State (Combined Study) Method includes a *method study* and production study also. These are described briefly as follows:

Method Study

To obtain essential data for a method study, time-study observers also fill out Form B on the job. This lists the following information: Name of mine, section, shift, number of shifts per day, number of men in section, tonnage of shift studied, average shift tonnage for past six months, places worked, cut, stand-by positions, distance from face to discharge; and the type, age, capacity, and interval between overhauls for loaders, shuttle cars, drills, cutters, discharge, mine cars, belt, car spotter and other equipment.

A map of the section studied is obtained showing: various loading places, routes traveled by shuttle cars, stand-by points, discharge stations, cable anchorages, battery stations, ventilation doors, and main-line transportation. These conditions are also noted: travel distance, seam thickness, width of travelways, direction and percent of grade, roof and bottom conditions, timbering, and method of discharge.

Careful study of the section diagram may reveal these defects: complicated travel routes that can be simplified; right-angle turns that can be eliminated; stand-by points unnecessarily far from loaders; cable interference, especially at ventilation doors; discharge points accessible from only one side of entry; and track layouts inadequate to provide empties as needed.

Production Study

In a final step, all facts obtained are boiled down into key performance ratings which can be used to compare relative productivity of men and machines in one section with that of another, or to determine gain or loss in productivity in one section over a period of months.

A "Master Summary Form" is provided for this purpose. It includes these items obtained from time and method study data: number of men in section; tons per man-shift; ratio of shift-tons to average (Penn State records contain averages for comparable coal workings acquired from many time studies); working time of loader; tons per loader hour; average loading time per ton; number of trips; tons per shuttle car; productive use of shuttle car; average distance per round trip; average speed traveling empty; average speed traveling loaded; average discharge time per trip; average discharge time per ton; average time at loader per trip; ton-miles per shuttle-car-hour. Convenient arrows printed on the form serve as a constant reminder to indicate desired trends. Thus an arrow in the "number of trips" line points up, while an arrow in the "average loading time" line points down.

After performance has been summarized, results must be interpreted. On the basis of many studies made at Penn State, here are a few of many conclusions drawn:

Large time totals for DM_S and DM_L indicate faulty equipment, overloading, poor maintenance, or unsuitability of machines.

High DS means: primary haulage operated inefficiently; primary haulage poorly coordinated with section requirements; discharge methods poor—particularly car spotting; or poor engineering layout.

High DN means: bad mining conditions; poor roadway and roof control; lack of runaround for shuttle cars; or lack of working places for loaders.

High WO and CC means: wrong stand-by position; too lengthy hauls; or insufficient number of shuttle cars.

High PC means: slow tramming speeds or poor engineering layout.

Slow speeds mean: poor roadway maintenance; operator is inefficient; poor machine maintenance; or poor engineering layout.

The following data based on case studies by the Mineral Industries Experiment Station at Penn State College, indicate the wide range of efficiencies existing in loading and hauling operations at various mines.

In 73 cases studied, maneuvering time (M) averaged 4.83% of total shift time, but varied from 0.15% to 17.20%. High M indicates a poor operator, faulty face preparation or a bad roof.

In 95 cases studied, waiting for other car (WO) averaged 12.25% of total shift time, and varied from 1.11% to 26.78%. High (W) means poor layout and poor coordination.

In 74 cases studied, place change (PC) averaged 8.59% of total shift time, and ranged from 0.30% to 21.6%. High PC means poor layout and inefficient supervision.

In many of the cases studied, a need for better maintenance procedure was clearly evident. Mechanical delays were caused by minor failures in shuttle cars and loaders, cable failures, and main power failures.

Bulletin Describes Method

The complete explanation of this combined study method including sample copies of all forms used, a thorough analysis of causes of and remedies for time losses and inefficiencies based on numerous studies made in coal mines, and average performance ratings for numerous mine sections is now being prepared by the authors and will soon be released as Bulletin No. 50, "More Profit in Mechanical Mining," by Pennsylvania State College, Mineral Industries Experiment Station, State College, Pa. Copies of these well-illustrated books will be available about March 1 for $3.00 per single copy, and $2.50 for quantities of 10 or more.

WORKING OFF A CORNER in the Roberts Bros. pit at Dora, Ala., where special emphasis is laid on clean loading.

Bulldozers Help Shovel

Highwall Top Kept Fairly Even for Stripping Shovel at Alabama Operation by Two Bulldozers Working at Right Angles—Special Loading Plan Plus Good Cleaning Assure Product Free From Possible Contamination

TWO BULLDOZERS working on the highwall ahead of the stripping shovel are operated in paths at right angles to each other to keep the highwall top fairly even at a new 300-ton-per-day strip mine three miles from Dora, in Walker County, Alabama. The production is 15 tons per man-shift loaded into trucks in the pit and not counting the men engaged in driving the trucks.

Mining is in the top bench of the Mary Lee seam, which here averages 36 in. in thickness, is free of partings and lies generally flat but with many local rolls and dips. The terrain is moderately hilly.

The Hilzener & Crulo Coal Co., with eleven years of stripping experience, does the stripping and loading for the Roberts Bros. Coal Co. The latter company has been operating underground truck mines in the district and continues operating two of these mines along with this open pit, which is its first venture in stripping and was started July 1, 1948.

Equipment used by Hilzener & Crulo consists of the following: one International TD-18 bulldozer, one Allis-Chalmers HD-14 bulldozer, one Lorain diesel-driven stripping shovel with $1\frac{1}{4}$-yd. Missabe dipper, one locally-made gasoline-driven horizontal drill, one Buckeye gasoline-driven coal-loading shovel with Pettibone Mulliken $\frac{3}{4}$-yd. dipper and one Jaeger gasoline-driven pump.

A pit is opened by making a box cut 25 to 30 ft. wide, using the bulldozers ahead and following up with the strip shovel. The next operation is drilling the shale highwall, with the 3-in.x36-ft.-deep holes on 12-ft. centers. The holes are loaded with $2\frac{1}{2}$x24-in. sticks of 40-percent Hercules dynamite bedded about $2\frac{1}{2}$ ft. above the coal.

After the highwall is shot the two bulldozers work on top of the shot ahead of the strip shovel. One bulldozer with its blade set at maximum angle works in a path parallel to the highwall, while the other works in conjunction with it but at right angles to the highwall to push the material into the pit. This keeps the top of the highwall trimmed to a uniform slope.

It is only when the strip shovel gets blocked that a bulldozer comes down off the top of the highwall and pushes the material away from the shovel. No leveling of the spoil is done inasmuch as the land is very poor and there are no requirements in that respect.

The coal is loaded without shoot-

BULLDOZERS ON THE JOB—but not, because of corner working, in accordance with the standard right-angle plan.

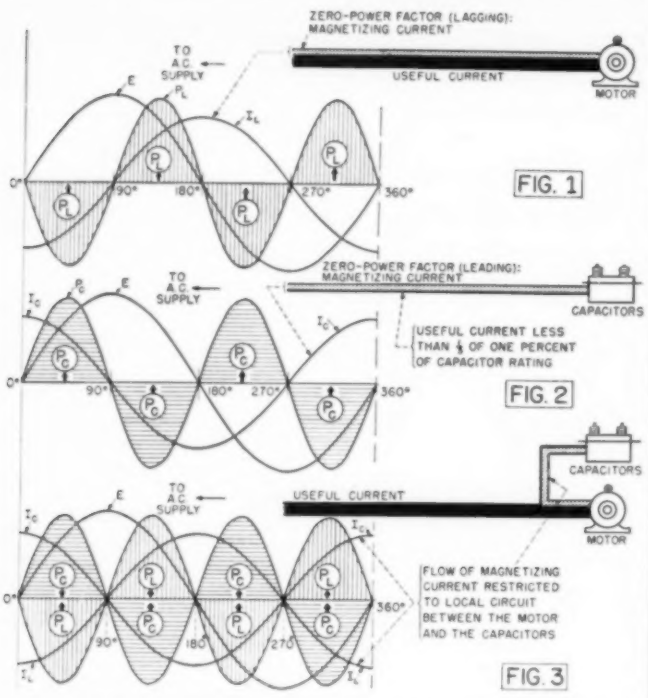
ing and special care is exercised in cleaning top and bottom to avoid any contamination. After a bulldozer has scraped off the top of the seam a man with a hand-wire broom and shovel finishes the top cleaning. The loading shovel always keeps 2 in. above the bottom of the seam. Two men working with hand shovels and positioned between the front of the shovel and the back throw of the dipper pick up the 2 in. of bottom coal and throw it ahead where the dipper can get it. This 2 in. of coal parts cleanly and freely from the bottom material.

Hauling the coal 4½ miles to the Roberts Bros. loading ramp at Quinton on the Frisco Ry. is done with three trucks owned by the Roberts organization and by extra trucks hired as necessary. The Roberts trucks are rated at 2½ tons but carry 5½ to 6 tons. Cost of hauling with the hired trucks is 10c. per ton-mile.

Stripping is carried on two shifts per day six days per week, with loading one shift per day. Five men and one boss, or a total of eleven men for two shifts, work at the stripping. On days when loading is done the stripping contractor employs four more men, one operating the loading shovel, two taking up coal bottom in the pit and one on top of the seam sweeping.

CARL ROBERTS (left), partner in Roberts Bros. Coal Co., with L. E. Crulo, a partner in Hilzoner & Crulo Coal Co., the contractor for stripping and loading at this operation. Roberts Bros. is continuing to operate two underground mines in the district.

At the time the illustrations were made the pit was 500 ft. long. It was to be extended to about 3,000 ft. as soon as the proper drainage was accomplished. With the present equipment, 35 ft. is the maximum depth to which the stripping can be done. Extension of workings to a greater depth at this pit will call for a dragline.



FIGS. 1-3—HOW CAPACITORS at the motor terminals act to correct power factor.

Table I—Recommended Maximum Capacitor Rating When Capacitor and Motor Are Switched as a Unit*

Representative data for three-phase 60-cycle splashproof 50 deg. C. 440-volt induction motors for oil well pumping service

Hp. Rating	Motor Speed in R.P.M. 1,800 Kvar†	% Ar‡	1,200 Kvar	% Ar	900 Kvar	% Ar
NORMAL-STARTING-TORQUE MOTOR						
5	2	14	2	16	3	25
7.5	3	13	3	15	4	22
10	4	11	4	12	5	17
15	5	11	5	11	7.5	16
20	5	10	5	11	7.5	15
25	7.5	10	7.5	10	10	14
30	10	9	10	10	10	13
40	10	9	10	10	12.5	12
50	12.5	9	12.5	9	15	12
60	15	9	15	9	17.5	11
75	17.5	8	17.5	8	20	11
HIGH-STARTING-TORQUE MOTOR						
5	2.5	16	3	22	4	30
7.5	3	14	4	19	5	27
10	4	13	5	17	7.5	25
15	5	12	5	15	10	22
20	5	12	7.5	14	10	19
25	7.5	12	10	13	12.5	18
30	10	12	10	13	15	17
40	12.5	11	15	12	20	17
50	15	11	17.5	12	22.5	16
60	17.5	11	20	11	25	16
75	20	11	25	11	30	15

*The motor power factor, with capacitor ratings listed in this table, will range from 95 to 98 percent at full load, and from 95 to 100 percent at partial loads ranging from 50 to 75 percent.

†KVAR is the rating of capacitors in kilovolt-amperes connected at motor terminals.

‡%AR is the percent reduction in line current due to capacitors and is helpful in selecting the proper motor overload setting when the capacitor is connected to the motor terminals.

Installing Capacitors at Motors

How Capacitors Operate to Correct Power Factor When Installed at Motor Terminals — Such Installation, However, Requires Guarding Against Overvoltage and the Choosing of New Overload Heater Elements

WHEN CAPACITORS for power-factor improvement are installed at the terminals of induction motors and are operated from the motor starters, it is advisable to take certain operating precautions. These include: (1) guarding against excessive voltage; and (2) choosing new overload heater elements to bring overload protection back within the 125-percent range.

For controlling power factor in the preparation plant it may be advisable with the larger motors to locate the capacitor units at the motor terminals. Here, they will be switched on and off by the motor starter. Consequently, the capacitors will be on the line only while the motor is operating—when they are needed most. The instant the starter is closed the capacitors will draw leading reactive kilovolt-amperes to offset the lagging reactive kilovolt-amperes required by the induction motor for magnetizing current. The lagging reactive power drawn by the motor serves the useful and very necessary purpose of establishing the working flux or magnetization, while the active power (measured by the watt-hour meter) supplies the losses and takes care of the work performed.

As the reactive power is not registered by the watt-hour meter, most power contracts contain a power-factor clause. Accordingly, when the power factor is in the penalty range, each customer is penalized for his proportionate share of the revenue needed to cover the added investment in electrical equipment.

As already indicated, the current drawn by an induction motor consists of magnetizing current and useful current. The magnetizing-current requirements for a squirrel-cage motor increase slightly with load, while the useful current varies directly. A motor's need for magnetizing current cannot be eliminated. Any equipment that draws all or part of the excitation for its magnetic circuit from an a.c. system requires some magnetizing current. However, the effect of the magnetizing current (responsible for lagging power factor) can be minimized or corrected 100 percent by using synchronous condensers (rotating units) or capacitors (static

condensers). In this discussion the power-factor correction equipment used is assumed to be capacitors.

Magnetizing current, in a sense, is free power, behaving in a strange manner, which can best be explained graphically by the much-referred-to 60-cycle sine wave for a.c. voltage and current. The frequency of the power wave supplying the motor's magnetic energy, treated as pure inductance (P_L, Fig. 1), is double the frequency of both the 60-cycle voltage and current waves.

During the first quarter of the 60-cycle time interval (using the 60-cycle voltage wave as the reference), when the polarities of the voltage and current waves are unlike (being on opposite sides of the horizontal axis), the energy already stored in the magnetic field is returned to the power source. However, during the next quarter-cycle, when the voltage and current polarities are alike (both positive), energy again is stored in the magnetic field. This process is repeated in succeeding quarter-cycles.

If the resistance of the electric circuit is neglected, all the energy stored in the magnetic field of the motor during one instant is returned to the power source the next. Thus, this energy really is not consumed. Over a complete cycle the reactive or wattless power taken by the motor field averages zero. Nevertheless, this phenomenon, as mentioned, must exist to enable the squirrel-cage motor to function.

Inductive-Circuit Operation

The reason that the polarities of the a.c. voltage and current waves (Fig. 1) are unlike part of the time is because the waves are a quarter-cycle out of step. In a purely inductive circuit the current lags the voltage producing it by 90 deg. It should be noted in Fig. 1 that the power wave is only for the magnetizing current and is considered as being separate and apart from the true or real power requirements of the motor (including the losses) as registered by the watt-hour meter.

When capacitors (Fig. 2) are connected to an a.c. power supply a charging current is drawn similar to the magnetizing current drawn by the motor in Fig. 1—except that with capacitors, the current is zero power factor leading. The current leads the line voltage by a quarter-cycle or 90 deg. But, like the temporary storage of energy in the motor's magnetic field, energy (P_c) likewise is stored temporarily between the plates of the capacitors (condensers). In fact, the capacitors, too, demand energy (P_c) from the power supply one instant and return it in the next.

As shown by the curves in Fig. 2, the capacitors receive a charge from the power source during the first quarter-cycle when the voltage and current are positive. This is directly opposite to the action of the motor field in Fig. 1, which was returning energy to the power system at that instant. During the next quarter-cycle, when the voltage and current polarities are unlike, the capacitors return the stored energy to the line. At this time, it will be remembered, energy was being stored in the magnetic field of the motor in Fig. 1. In the third and fourth quarter-cycles, this same charging and discharging cycle is repeated. Very little of the current drawn by the capacitors is measurable by the watt-hour meter, since it is largely wattless. The losses in watts in modern capacitors are guaranteed by the manufacturer not to exceed one-third of 1 percent of their rating. Capacitors, therefore, are about 99.7 percent efficient.

Combining Figs. 1 and 2 shows what happens when capacitors are installed at the terminals of the induction motor (Fig. 3). After an initial charge from the line, the necessary reactive power pulsates automatically back and forth between the capacitors and the motor, provided the capacitors are matched. If the power factor of the circuit is improved to unity (100 percent), no magnetizing current will be drawn from the power source and only the useful current for the motor will be needed.

The power curves (P_c, P_L) in Fig. 3, like the P_L curve in Fig. 1, do not take into account the consumption of useful current by the motor or the capacitors. The purpose of Fig. 3 is to show, when sufficient capacitors are used, that the magnetizing and charging currents are sufficient to satisfy the reactive kilovolt-ampere needs of the motor, and that no magnetizing current need be furnished by the power supply.

Thus, connecting capacitors at the terminals of the motor reduces the line current to the motor. Power-factor correction seldom is carried up to the 100-percent mark. However, connecting capacitors (in any capacity) at the motor terminals reduces the magnitude of motor current taken from the line. Therefore, the starter mechanism should be revised accordingly to properly protect the motor against sustained overload. The accompanying table, from *Electrical Construction and Maintenance*, gives the approximate percent ampere reduction (% AR) as a result of mounting capacitors at the terminals of the motor and is useful in selecting the proper motor-overload heater element.

Suppose, for example, that the full-load current for a 25-hp. 440-volt 1,800-r.p.m. normal-starting-torque motor is 32 amp. Suppose, too, that a 40-amp. heater element is used to permit the starter to trip on 125 percent of the motor's full-load current rating before capacitors are added. From the accompanying table, if 7.5 kvar of capacitors is installed at the motor, a 10-percent reduction in line current results. This means that the overload heater elements must be replaced to restore the 125-amp. tripping rating. The rating for the new heater element is: (32-3.2) x 1.25, or 36 amp.

Overvoltage Dangers

One text warns against overvoltage when capacitors are used at the terminals of the motor. It points out that after deenergizing of the motor starter the capacitors may excite the field of the induction motor, converting it into an induction generator. This generator action, under certain conditions, may impose a dangerously high voltage on the equipment. If the capacitor rating is small in comparison to the horsepower rating of the motor, or if the motor coasts to a stop quickly, the generator action will not be significant. But if the capacitor rating is large in comparison to the horsepower rating of the motor, and if the motor, because of the flywheel effect of the drive, coasts for a considerable period after the power is cut off, then the voltage may build up to double the line voltage.

To be on the safe side, the text suggests using capacitors with only enough reactive kilovolt-ampere capacity to bring the power factor of the motor circuit to unity when the motor is operating at no load. It also suggests making the following voltage test after the capacitors have been installed: With the motor driving its normal load, deenergize the motor starter and record the rise in voltage. If the reading is not more than 150 percent of the motor's nameplate voltage rating, then, according to that source, there is no cause for alarm.

STRIPPING AT ROSEBUD MINE with the special long-reach shovel in the pit throwing the spoil up to be rehandled as necessary by the dragline operating on the spoil bank.

Rosebud Stripping

Equipment and Methods Based on Handling 50 to 80 Ft. of Overburden to Recover 25 to 28 Ft. of Coal—Continuity of Output Promoted by New Service Center—Employee Well-Being Stressed

WITH UNUSUAL CONDITIONS not only in coal, overburden and terrain but also in climate and location, Foley Bros., Inc., employs many unusual methods and equipment units in stripping coal for the Northern Pacific Ry. at Colstrip, Mont. Present operations are in a new pit where more than 140 ft. of overburden has been stripped, and to which all the offices, shops, warehouses and other facilities were moved in the past two years or so, the move involving construction of complete new facilities for all these services. The move came on top of a wartime expansion program that doubled the daily output, and additional facilities will permit a further increase from the present level of 7,000 to 7,500 tons per shift if desired in the future.

Operation of the Rosebud mine by Foley Bros., Inc., goes back nearly 25 years. Production started in 1924 with a Bucyrus-Erie 175-B loader with a 6-yd. dipper, a Marion 350 stripper with 6-yd. dipper, a Marion 360 dragline with 150-ft. boom and 5-yd. bucket (later changed to 175-ft. boom and 8-yd. bucket), and two 60-ton General Electric storage-battery locomotives for handling railroad cars in the pit and yards. In 1929, a 200-B machine was bought for coal loading and a 750-B for stripping. A 1050-B special went into stripping service in 1943. At the same time, the old 350, which had stood idle for over 10 years, was converted to a 15-yd. coal-loading shovel.

Equipment Capacity Boosted

Additional dragline capacity became necessary in 1945 and therefore a 170-B with 9-yd. dipper was installed for coal loading and the 350 was converted into a second dragline with 175-ft. boom and 8-yd. bucket. Now, the 350 is being torn down and the base and cats are being remodelled in preparation for installing the upper works of a 550-B shovel with 17-yd. dipper for coal loading. The rebuilding involves changing the gear ratio to greatly reduce cycle time.

Taking into account other purchases and disposals already consummated or planned, stripping and coal-loading equipment stood as follows at the end of 1948:

Stripping—1050-B special shovel with 134-ft. boom, 90-ft. stick and 20-yd. dipper; 750-B shovel with 120-ft. boom, 90-ft. stick and 13-yd. dipper; 360 dragline with 175-ft. boom and 8-yd. bucket; 120-B dragline with 100-ft. boom and 5-yd. bucket.

Loading—550-B on 350 base with 17-yd. dipper.

The 360 dragline has been extensively rebuilt and re-equipped since its first installation. The drag and hoist motions now are fitted with the largest Fawick Air-Flex clutches ever made, which have materially smoothed out operation and reduced maintenance. Anti-friction bearings have been installed practically throughout and hydraulic brakes designed and built at the mine have been substituted for all mechanical brakes.

The new 550-B loading unit will include dual operator's cabs, one on each front corner. Consequently, regardless of the direction of loading, the operator will always be in the same position in relation to the cars—a major advantage in view of

LOADING COAL out of the 25- to 28-ft. seam into standard railroad cars at Rosebud mine.

PEAK OVERBURDEN of 145 ft. in this section of the pit was spoiled by two shovels and the dragline in the distance.

the depth of coal, size of equipment and high hoist consequently necessary.

The seam being recovered is the Rosebud, from which the property takes its name. Thickness is 25 to 28 ft. and the coal lies generally flat, with only local dips. The present pit is U-shaped, with its axis a stream that was dammed off and diverted at a point up the slope above the overburden limit, the land rising from the outcrop. Minimum thickness of overburden usually stripped is 20 ft. The maximum tackled to date, for a short distance, is 145 ft. Because the operation regularly works to 80 ft.—sometimes 90—and rehandling generally is necessary after about 60 ft., great care is taken not only to locate the outcrop for the initial cut but to plan the entire pit in advance to make sure that room is provided for every cubic yard of spoil.

Stripping Ratio 2:1

The average stripping ratio is about 2:1. A blue shale lies directly over the coal and varies from a few feet up to 30 to 40 ft. in thickness. The blue shale is followed by sandstone which, in the high banks, goes almost to the grass roots. In low banks, however, considerable soil overlies the hard material.

Coal cuts are now standardized at 85 ft. but will shortly be increased in width when the new coal loader goes to work. In addition, a 40- to 55-ft.-wide track berm is carried to prevent boulders and spoil from rolling over the track in shooting the deeper overburden. A wide pit is necessary to permit the use of big equipment for loading. As a result of this and of the depth of overburden regularly handled, the stripping units always have been equipped with extra-long booms and sticks, even though rehandling is regular practice. With, as noted, a boom length of 134 ft. and a 90-ft. dipper stick, the 1050-B stripper has a swing diameter of over 300 ft. and can dump to a maximum height of 81 ft. The design includes amplidyne control of all motions, automatic hydraulic leveling, hydraulic steering, counterbalanced hoist and twin swing units.

Cabs of all large units are insulated on the inside with wallboard, and furnaces are installed on all stripping and loading units, with blowers for winter heating. The interiors are kept free of dust by blowing a large volume of outside air into them through American Filter Co. air filters, the high velocity of air out of the cable openings preventing the entrance of dust there. The air from the motor blowers is exhausted outside the cab in hot weather to keep it cool and inside in cold weather to help heat it. As a further aid to good maintenance, all interiors are painted white.

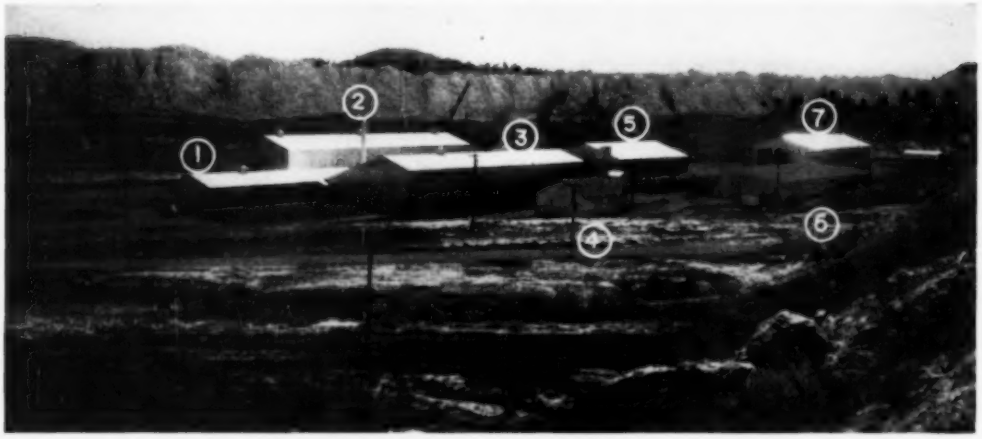
To prevent breakage in winter, when the temperature drops to as low as 40 to 50 below, the tubular sticks on the 1050-B and on the 550-B loader to be installed are heated. As a result of experience, the original heating system has been changed to flat strip heaters mounted flush against the insides of the dipper-stick walls, with thermostatic control operating automatically in accord with outside temperature. More positive results are expected with a saving in power compared to the old system with an air space between the elements and the dipper-stick walls.

Spoil Rehandled

Rehandling rather than reducing the height of the highwall has been adopted as standard practice at Rosebud mine as a result of long experience in operating in deep overburden. When the dragline is used as a rehandling machine operating on the spoil bank, it throws back only as much material as necessary and no more, thus leaving the maximum volume of overburden to be handled by the shovel. A much smaller higher-speed dragline may be used than the type that would be required for use on the highwall. Operating officials are of the opinion that in the Rosebud field rehandling with a dragline on the spoil is cheaper, all things considered, than the more usual tandem operation with the dragline on the highwall.

In working through the 145-ft. peak encountered in the new pit, a combination of two shovels and a dragline was employed. The 1050-B went through on the outside edge of the cut, throwing its spoil over as far as possible. It was followed

New Rosebud Center Houses Modern Shop and Service Facilities



NEW ROSEBUD OFFICE AND SERVICE CENTER five miles distant from the old center in Colstrip. Buildings are: (1) Office, (2) machine shop, (3) warehouse, (4) oil house, (5) garage, (6) equipment shed, (7) locomotive roundhouse.

MAIN SHOP AT ROSEBUD showing arrangement of working space, with pit in the center, and major tools.

by the 750-B, which threw to the edge of the coal, where its production was picked up by the 360 dragline, working on the spoil bank. There was barely spoil space enough, even with the dragline high up and stacking to maximum depth, to permit working through the high spot.

Overburden drilling and shooting also has been the subject of considerable experimentation at Rosebud, with the conclusion that a variety of methods will be necessary in the future as in the past. Equipment includes a hydraulic-thrust sidewall drill using 6-in. bits with tungsten-carbide cutting edges, Bucyrus-Erie 42-T vertical units with 11-in. bits, and a horizontal blasthole loading machine. Horizontal and vertical blastholes are employed separately under certain conditions, but a combination is most generally used.

The coal is drilled for shooting with special Sullivan lightweight pneumatic units equipped with 2⅝-in. bits. Air is supplied by two 365-c.f.m. Gardner-Denver electric compressors. To prevent accidents, coal holes are shot off a three-switch box. All three switches are normally open and all must be closed before a shot can be fired.

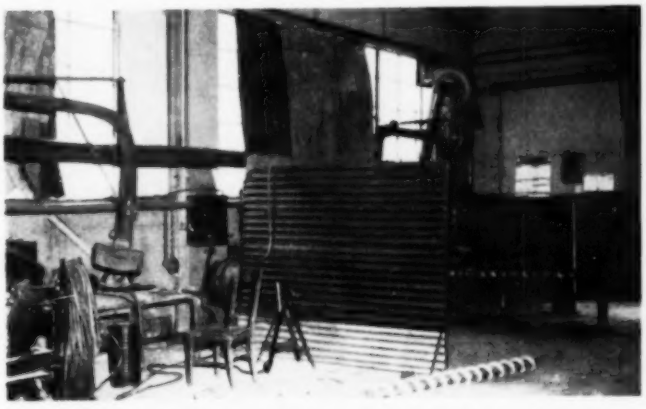
Standard Rail Cars Loaded

Standard railroad cars are run into the pit for loading and are delivered to the railroad without further operation. Trips are handled by two 1,000-hp. Baldwin diesel-electric locomotives leased from the railroad. A smaller 600-hp. Ingersoll-Rand diesel-electric locomotive is on hand for emergency use. The pits are arranged for loop haulage. In other words, track is laid clear through and cars can be run in from either direction. Consequently, there is no delay while trips are being changed.

Weight of the rail is 100 lb. and the track is prefabricated in rail-length sections. These are stored in stacks until needed and then are loaded on a flat car by an American locomotive crane. The crane and flat car then are run to the track-laying site and the sections are lifted off by the crane for installation.

Motor-truck roads for service to the office, shops, storage depots and pits are built with scoria from old outcrop fires. A crushing plant reduces the scoria to the proper size and otherwise prepares it for use.

PART OF THE ROSEBUD WAREHOUSE showing left and rear sectional steel and wood bins for parts storage.



THE WELDING SHOP is separated from the main shop and includes an exhaust system.

Because railroad-fuel requirements necessitate continuous operation and because Rosebud mine is rather remote from the usual sources of supply, self-sufficiency in all departments, including repair facilities, is a major principle of operation. The principal item on which dependence must be placed on an outside source is power. However, while the 90-mile line feeding the property is subject to the usual hazards, utilization on the job has been improved in several directions.

Power is distributed by pole lines paralleling and ahead of the pit. Laterals normally are not installed. Instead, the main lines are moved back as necessary. To reduce labor in pole-line construction, a special pole-setting truck is employed. It carries a 24-in. Buda-Hubron auger, a winch and a crane hinged on the end of the truck. In the field it is accompanied by a trailer on which poles are carried ready for setting.

Cable Handling Facilitated

Cables serving the equipment are cut into 500-ft. sections. Cable handling and changing is facilitated by a cable truck carrying a reel with hydraulic motor and a capacity of 800 ft. An extra 500-ft. section of cable is kept on hand, and when it is time to change, the truck goes into the field and runs the cable off in the desired location. Then the power is cut off while the previous connection is broken and the cable section on the shovel is moved ahead to connect to the new piece on the bank—a matter of only a few minutes. Then the truck goes back and winds up the old section for storage or moving ahead, as the case may be—again a matter of only a few minutes.

In handling water, as previously noted, the stream down the middle of the present pit location was dammed above the stripping limit and the water diverted through a ditch to a location beyond the pit area. Casual water normally is handled by pumping. Facilities include a 3-in. pump, which may be moved to either end of the new coal-loading shovel to keep that part of the pit in which it is working free of water. Hoses formerly were used for conducting the water out of the pit, but a supply of 4-in. quick-coupling aluminum irrigation pipe in 30-ft. lengths has been purchased and will be used instead of hose in the future.

Water for drilling is collected in two portable tanks with automatic control for starting and stopping the supply pumps in the pit. Soil-heating cable is installed in the tanks to keep the water from freezing in winter.

Auxiliary Equipment Varied

Aside from shops, storage facilities and other equipment previously noted, the program of providing the property with everything necessary for continuity of operation, as well as for greater efficiency, has involved installing the following:

American Hoist & Derrick 30-ton locomotive crane.

Koehring 1½-yd. diesel utility dragline and crane.

Three Caterpillar D-8 tractors with bulldozers.

Traxcavator 1-yd. dozer shovel.

Galion road patrol.

Caterpillar 45-kw. diesel electric power unit on pneumatic tires.

Gardner-Denver diesel-powered utility compressor on pneumatic tires.

Snow plow.

Fruehoff 50-ton equipment transporter with Kenworth truck for power. The transporter is used for moving tractors, the utility dragline and other equipment as necessary. The Kenworth truck is equipped with a 10-yd. rock body for use as necessary.

A fuel-and-lubrication truck for tractors, drills, and so on, comprising a gas-powered compressor, Graco lubricating units, four lubricating hoses on reels and four fuel drums with the necessary hose

equipment. Air pressure is used for dispensing the fuel.

Panel-body welding truck with hose reels and all the necessary equipment.

LaPlant-Choate 9- to 12-yd. scraper for road building, ditching and miscellaneous work.

Portable powder and detonator houses, supplementing main underground storage units that have a capacity of about 1,000,000 lb.

Service trucks and other miscellaneous equipment to handle practically any hauling and dirt-moving job.

Service Units Self-Sufficient

Self-sufficiency extends to all shop and service facilities at the Rosebud mine, which is equipped to handle practically any mechanical or electrical repair and to build special equipment when necessary. As previously noted, a complete new office, shop and service center has been built in the past two years some five miles away from the original location in the town of Colstrip.

The new center comprises an office building serving as operating headquarters, a shop building, a warehouse, truck garage, locomotive "round-house" featuring outside storage tanks and service islands inside for fuel, air and water, a parking shed for heavy intermittently used equipment, and water, fuel, heating and fire-fighting auxiliaries.

The site was filled, leveled and packed not only by the weight of the equipment but by sheep'sfoot roller. Foundation trenches then were dug by a bucket excavator and the concrete poured directly without building forms. To provide concrete, a central mixing plant was set up, using bins from the scoria-crushing plant, and the mixed concrete was trucked to the points of use. All floors are concrete, with the exception of the main shop, where handling heavy parts and equipment dictated the use of wood blocks on concrete.

The heating plant for all buildings is in a basement in the rear end of the office building. The equipment includes a Freeman stoker, Pacific Steel heating boiler serving the steam-vacuum system with unit heaters supplementing radiators, and hydraulic ash hoist. All buildings are ceilinged with 2-in. tongue-and-groove sheathing with asbestos roll roofing next to the Alclad. Wallboard is used inside all the walls with blanket insulation next to the outside sheathing.

The main shop at the Rosebud is made up of the shop proper with a pit with side bay so that complete locomotive trucks can be dropped and moved out for repair, a tool crib, a welding shop and a foundry, the latter two in separate rooms. Outstanding equipment in the main shop includes a 38-ft. 42-in. swing lathe, 8-ft. boring mill, a plate roll accommodating plates up to $1\frac{1}{4}$ in. thick, 3-ton crane over the machine bay, $7\frac{1}{2}$-ton P & H bridge crane over the main bay and a Yale & Towne electric crane truck with a capacity of 1 ton on the crane and 3 tons on the platform.

The welding shop is equipped with its own 3-ton crane and an exhaust system for carrying off welding smoke and fumes. A foundry adjoins the welding shop and is equipped with a small bronze furnace for casting bushings, etc., and a forge and power hammer. A mezzanine provides space for an acetylene generator and oxygen cylinders, which are lifted up by a special cage and hoist. All shops are provided with all the necessary convenience outlets at frequent and logical spots. These conveniences include water, welding and power outlets and outlets for acetylene, oxygen and compressed air, which are piped in from the central stations.

The truck garage includes an engine hoist large enough to handle the biggest engine employed and a dual truck-and-car lift, one element being used to lift small trucks and cars for lubricating and other services, with the second lift being called upon when large equipment is handled.

Parts Storage Systematized

In addition to a 5-ton bridge crane, the Rosebud warehouse includes a screened-off room for certain materials and sectionalized steel and wood bins for storing smaller items. The sectionalized bins facilitate additions or changes if it is necessary to increase stocks of certain items, add new ones or change the arrangement. A perpetual inventory is maintained on all repair parts.

Water for drinking, washing and boiler use is obtained from a 500-ft. well drilled by a 42-T and equipped with a jet pump feeding to an elevated wood storage tank.

Water and pressure for the fire system is supplied by a Fairbanks-Morse fire pump. In addition to hydrants, fog-nozzle stations are located at strategic points in and around all buildings. In case of fire, operating a pushbutton switch at any station starts the pump and at the same time sets off the siren in town, where a fire truck with a booster pump is stationed and of course is available for use around the plant as well.

Including the office staff, the normal working force at the Rosebud mine is 95 to 100, of which 75 to 80 are in the field. Buses transport the men to and from Colstrip, five miles away, morning, noon and night.

Community Offers Good Living

The town of Colstrip exists only for the benefit of the mining operation and no effort has been spared to make it a good place to live. The management has always been convinced that, since the 40 hours a week a man spends at his work is only 25 per cent of his total time, it is just as important to provide first-class facilities for living, recreation and education as efficient mining machinery. Colstrip boasts comfortable, modern well-maintained houses, paved streets and excellent sanitary facilities. It has a well-equipped store, dairy, mess hall and dormitory and its recreational facilities include a modern theater, fountain lunch, club rooms, rifle range, swimming pool, skating rink and athletic field. A new school building with gymnasium and a teachers' dormitory compares favorably with the most modern facilities in large cities.

These things, plus a very liberal employees' benefit plan, which includes retirement pensions, life insurance, sickness and accident indemnities, and hospital and medical service, have contributed importantly to an almost complete lack of labor turnover.

Edward T. Foley, of Pasadena, Calif., who originally planned the operation 25 years ago, actively heads the management and is assisted by D. A. Daly, president of Foley Bros., Inc., St. Paul, Minn. Operating officials at Colstrip include W. V. Styles, general superintendent; Oscar Carlson, operations foreman; Sherman Lang, mining engineer; R. H. Wilsey, master mechanic; and E. M. Stretton, office manager. The owners are represented at Colstrip by E. L. Dorsett, superintendent for the Northwestern Improvement Co., subsidiary of the Northern Pacific Ry. Co.

F. A. Jordan (left), general superintendent, Roden Coal Co., Marvel, Ala. Right photo: Four district general superintendents, Coal Division, Eastern Gas & Fuel Associates, on a company tour, at the Everett (Mass.) coke plant. M. L. Workman (left), Pocahontas district; A. P. Boxley, Kopperston-Wharton; Otto Becker, Everett works manager; S. H. Thatcher, Winding Gulf; and H. L. Moore, Powellton.

COAL MEN ON THE JOB

R. G. Johnson (left) and E. S. Stephens, two of four partners, Spiro Coal & Mining Co., Spiro, Okla.

George F. Burnette (left), chief electrician, and Walter Bryant, section foreman, No. 4 mine, Black Star Coal Corp., Alva, Ky.

H. J. Garrison (left), electrical shop foreman, Pittsburg & Midway Coal Mining Co., Pittsburg, Kan.; A. A. Porter, shop foreman, Mackie-Clemens Coal Co., Pittsburg, Kan.; Obie Dilldine, pit foreman, Broken Arc Coal Mining Co., Okmulgee, Okla.; and T. K. Dale, assistant superintendent, Praco mine, Alabama By-Products Corp., Praco, Ala.

EXIDE-IRONCLAD BATTERIES *are DIFFERENT!*

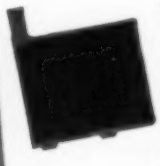
Specially designed to provide dependable power for mine locomotives, shuttle cars, trammers.

Storage batteries are called upon to perform many tasks. No single type of battery is adequately suited for all. Exide engineers have developed batteries designed to fit each power requirement. They differ in a number of ways, but chiefly in the positive plates around which the other elements are built. In the Exide line there are three basic types of positive plates. The Exide-Ironclad was developed to meet the need for a heavy-duty battery with great reserve power and the ability to discharge at high rates, at high voltage and over a long period of time.

Exide-Ironclad Batteries are DIFFERENT ... different in design ... different in construction ... different in service qualities. Chief among these differences is the unique positive plate, an exclusive Exide feature, which provides advantages not possessed by any other type of plate used in batteries for motive power service. See opposite page for detailed description.

DESIGNED FOR STATIONARY USE

The manchester type of positive plate has the unique lead button construction... rolled strips of corrugated lead, pressed into holes of lead antimony grid. It is widely used by electric utilities, telephone and telegraph companies, radio and television stations... and for railway signal systems, emergency lighting and other stationary applications.



DESIGNED FOR AUTOMOBILE USE

The Exide flat positive plate is of staggered grid construction, pasted with active material which years of experience has proved most efficient and durable for the services for which it was designed. Used for starting, lighting, ignition and other services in cars, trucks, buses, aircraft and general storage battery tasks.

DESIGNED FOR MOTIVE POWER

The Exide-Ironclad positive plate, of slotted tube construction, was developed by Exide Engineers to provide a battery of extra power, sturdiness and durability to meet the exacting needs of motive power equipment. Exide-Ironclad Batteries are noted for high capacity and ability to deliver adequate power throughout each shift. Fully described on opposite page.

1888

DEPENDABLE BATTERIES FOR 61 YEARS

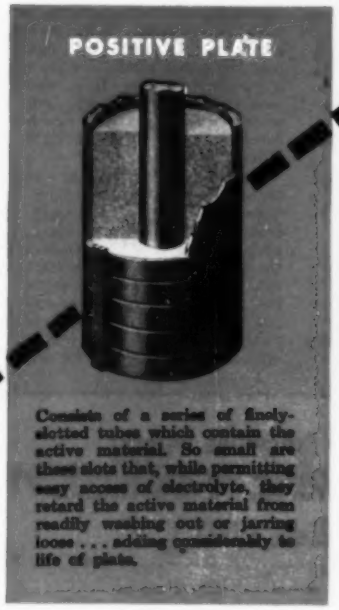
1949

Many Outstanding Features

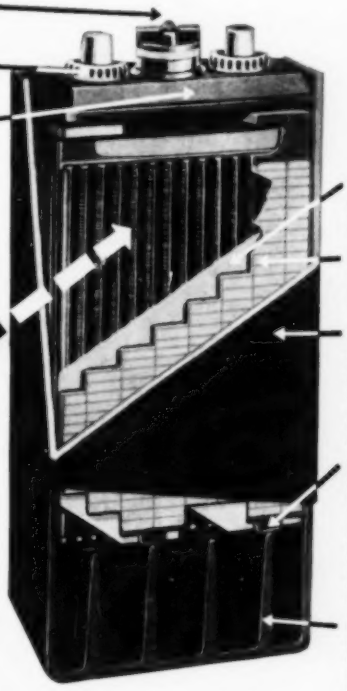
VENT PLUG
Specially designed to prevent escape of electrolyte.

GREASE SEAL RING NUT
Holds battery elements securely in place . . . prevents creepage of electrolyte . . . keeps tops clean and dry.

SEALED CELL COVER
Flush with top of jar. Prevents collection of dirt or moisture . . . keeps impurities out of cell . . . eliminates leakage of electrolyte.



Consists of a series of finely-slotted tubes which contain the active material. So small are these slots that, while permitting easy access of electrolyte, they retard the active material from readily washing out or jarring loose . . . adding considerably to life of plate.



SEPARATOR
Of high porosity, specially treated to last the life of the battery.

NEGATIVE PLATE
Made extra heavy and built to match the long life of the positive plate.

JAR
Made of specially tough and durable Giant Compound. Built to withstand the jolts and jars of hard industrial usage. Practically unbreakable in normal service.

FEET
Internal short circuits practically eliminated by having the two feet on negative plate rest on different ribs from those of the positive plate, and by having separators extend below both plates and rest on all four ribs.

RIBS
Support all plates and separators. Their height provides generous sediment space, so that internal cleaning is unnecessary.

Exide-Ironclad Batteries have ALL FOUR of the characteristics that a storage battery must have to assure maximum performance from battery electric mine locomotives, trammers and shuttle cars—high power ability, high electrical efficiency, ruggedness and a long life with minimum maintenance. The combination of these four Exide-Ironclad characteristics assures years of dependable day-in, day-out service with economy.

THE ELECTRIC STORAGE BATTERY COMPANY
Philadelphia 32
Exide Batteries of Canada, Limited, Toronto

SAFE DEPENDABLE POWER

"Exide" and "Exide-Ironclad"
Reg. Trade-marks U.S. Pat. Off.

The Foremen's Forum

How to Get Ready for Better And Bigger Jobs in Coal

A BETTER JOB in coal lies just ahead for every man who takes the trouble to win it for himself. With, say, 15 men to a crew, the right kind of miner can move up to section foreman if he is sharper than the other 14. A smart section foreman who stays on his toes can become the mine foreman if he keeps a fire built under himself. And so it goes, all the way up the line, to the very top jobs—superintendent, general manager, vice president for operations and president.

If you want proof that opportunity lies ahead, take a look at some of the top coal men. For example, the executive vice president of a big Ohio company started out as an electrician in the mines. The general manager of a thriving Indiana coal company got his start as a shopman. The president of one of the largest anthracite companies began as a water boy in a breaker. Those are only a few of the many coal men who have lifted themselves by their own bootstraps and moved up into positions of big responsibility. These, and others like them, show that in coal, as well as in other industries, a man can start at the bottom of the ladder and, through his own efforts, reach the top.

How did these men get ahead? Are the same opportunities still open? Can a man really get ahead these days? What things are in favor of the man who really wants to move up?

Here in America, everything is in his favor. Likewise, everything is in his favor in the coal industry.

America is one of the few places left in the world where a man, if he really wants to, can work out his own destiny. That is because the country still is growing and men can grow along with it. Free competitive capitalism is the real secret of opportunities in the United States—freedom of men to launch out on their own, to make their own mark in the world and to be judged by what they achieve. Here, no Russian commissar blocks a man's promotion, no Socialist bureaucrat tells him he cannot reinvest his profits in a new machine. All he needs to get ahead is ability and a willingness to make the effort and sacrifice it takes.

Likewise, there are few industries in America that offer as many opportunities as coal. Coal is growing, and growing fast. In the years ahead, as reserves of other fuels are exhausted, coal will have to shoulder a bigger share of the nation's energy market. Growth like this means more opportunities for men to move ahead.

More than that, revolutionary changes in mining and handling coal lie ahead—and not so far ahead now that new continuous-mining machines are moving into the mines. The man who keeps abreast of new developments like these will go places. Every new machine, every new method, means a chance for promotion for the man who keeps his eyes open and his ears pricked up.

However, getting ahead is more than just waiting around for opportunity to tap you on the shoulder. If your eyes are on a better future, you've got to get out and look for opportunity, and you've got to be ready to snatch it when you find it.

How can a man be always ready when he finds his opportunity? Here are a few helpful hints:

1. Watch the man above and study his job. Find out how he got where he is, how he learned what he knows, how much he has to do, what he is responsible for, how he schedules his duties for top efficiency and how he handles the men he is in charge of to get best results. If you think he makes a mistake in handling men, figure out how you could have handled the situation better. If he lets himself get bogged down in details, figure out how you would streamline his routine if you had his job. If he shows up poorly as a supervisor, figure out where he falls short in know-how, in personality or in adaptability to new ideas and new methods.

This does not mean that you have to be a snoop or a meddling fault-finder to make yourself ready for a better job. The man who openly complains and always finds fault gets in the boss' hair and, more often than not, ruins any chance he might have for his boss' recommendation. If you are wise, you will say nothing to your superior or to your fellow workers about his mistakes but will keep

How Are You Promoting Safety?

This quiz is designed to help you in your supervisory work. Study the questions and check "Yes" or "No." Then turn to p. 108 for explanation.

1. **Do you know how your safety record compares with that of your mine, your district and the industry as a whole?** ..... Yes ☐ No ☐
2. **Do you know exactly what is meant by such terms as "lost-time injury," "compensable injury," "frequency rate," "severity rate" and so on?** ..... Yes ☐ No ☐
3. **Do you try to find out why roof falls, wrecks and so on occur even if no one is hurt?** ..... Yes ☐ No ☐
4. **Do you regularly check your section and list all the unsafe practices and conditions you find?** ..... Yes ☐ No ☐
5. **Do you find yourself out of timber during the shift once in a while?** ..... Yes ☐ No ☐
6. **Do all the machines under your jurisdiction have all the prescribed guards in place?** ..... Yes ☐ No ☐
7. **Do you own a first-aid manual?** ..... Yes ☐ No ☐
8. **Do your men play practical jokes on each other all the time?** ..... Yes ☐ No ☐
9. **Are you satisfied if your men obey the rules?** ..... Yes ☐ No ☐
10. **Have you had any narrow escapes yourself lately?** ..... Yes ☐ No ☐

Free Tire Maintenance Program

(Just tear out and use this ad)

SHUTTLE CAR and other mine tires present one of the most difficult tire maintenance problems of any type of tire service. Many mine tires operate under wet conditions and are subject to excessive cutting and bruising from rocks, shale and coal. B. F. Goodrich tire experts have developed the following maintenance program to meet the special requirements of mine service:

(1) Once a week (generally on an off shift) delegate to a maintenance crew man the responsibility of checking and inflating all tires . . .

a. Any major drops in pressure; remove tire and examine for cause.

b. Inspect tires for cuts, snags; remove and repair.

c. Replace all leaky valve cores and make sure there is a cap on each valve.

(2) During the week—delegate to one man the responsibility of observing tires for any unusual air loss. If such loss is noted, remove tire, inspect and remedy cause. The man designated to observe tires should also replace any missing valve caps.

(3) Make certain that personnel checking tires have a *properly* calibrated pressure gauge.

(4) Remember—when you buy tires—B. F. Goodrich builds the famous Universal Silvertown *(with nylon shock shields)* especially for Shuttle Car Service. *The B. F. Goodrich Co., Akron, O.*

SUPPLEMENT YOUR MAINTENANCE PROGRAM

FREE! Tags and record cards for the BFG *Tire Coal Record System*—a scientific plan which involves the tags and record card shown in the picture above. Send this coupon to L. H. Taylor, The B. F. Goodrich Co., Akron, Ohio.

_____Fill in number of trucks and shuttle cars with pneumatic tires so we may send you correct number of tags.

NAME _____

ADDRESS OR P. O. _____

CITY & STATE _____

Truck Tires BY

B.F. Goodrich

them under your hat, together with what you learn. You can learn just about as well by somebody else's experience. That way, it doesn't cost you anything. You can store away what you learn for future use when you are on your own.

2. Look sharp for ways to improve efficiency around the mine. Then, when you get a good idea about how to get out more coal, make mining safer, improve a machine or boost quality, take it to your superiors. First, though, be sure your idea will work. Think it through carefully. Remember that it has to fit into the over-all operation. Look at it from every point of view—that of the superintendent, your fellow bosses and other departments of the company. Then, if it still looks good, plan your presentation ahead of time so that you can show your superior clearly how the idea works, how it will affect the rest of the operation and how it will improve present methods. That way, your idea will get a better reception.

3. But be careful not to by-pass your immediate superior. He is part of the chain of command set up to keep the company running smoothly. Take your idea straight to him. The chances are that he can help you by improving your idea and your presentation and by adding the weight of his approval when you carry your idea on up the line.

How do you stand to gain by thinking up ideas and pushing them? In the first place, you share, pay-wise and morale-wise, in better efficiency. In the second place, you build up a reputation for yourself as an observant and thoughtful man who means to get ahead and thus you stamp yourself as a possibility for the next opening up the line.

3. Put all you've got into the job you have now. The better you do your job, the better your superior looks to the men above him. When he looks good enough long enough, he'll get a promotion and when he moves up, you'll become a candidate for his job.

4. Learn all you can off the job. Schooling of one kind or another is available to almost everybody who wants to take the trouble to get it.

The International Correspondence Schools and other similar organizations offer mail courses in many subjects helpful to mining men as well as business men in general—in mathematics, chemistry, engineering, physics, English, mine safety, gases, electricity, explosives and personnel management, to mention only a few. A good many coal companies pay part of the cost of these courses for men who sign up for them. Ask around and see what your company's policy is.

Also, mining departments in some states, along with the U. S. Bureau of Mines, conduct classes for miners leading to certification as foremen and equipping foremen for bigger jobs. Keep a sharp lookout for these classes when they are offered in your neighborhood. They offer a fine opportunity to ready yourself for stepping into a better job.

Some coal companies, eager to build up a reserve of men qualified to take over management jobs, run their own classes in mining methods, safety, personnel handling and other subjects. Here is one of your best chances to make your interest and your ability known to your superiors. Usually, there is a lot of give and take in these classes, with opportunities for you to make your views known and to learn by the experience of your fellow workers and your company officials.

5. Be inquisitive about your company and the coal industry. The man who limits his horizon to his own narrow job will not get far ahead. A good coal man sees his own job in relation to the whole company operation, from mining through preparation to sale, and understands what his responsibilities are to other departments. He cultivates the habit of keeping his eyes and ears open and asking intelligent questions. He files away everything he learns and holds it in store for use when he moves up the next rung of the ladder.

6. Have faith in yourself. Expect some disappointments and hard knocks but learn to profit by them and to keep your self-confidence unshaken. Remember that the price of each step forward is sacrifice and hard work. That's the way men get to the top in coal.

•

Promoting Safety

"Yes" should be the answer to Questions 1, 2, 3, 4, 6, and 7, p. 106; "No" to Questions 5, 8, 9 and 10. The reasons, based on generally accepted principles, are:

1. Knowledge of how you stand is just as vital in safety as in any other activity. If your record doesn't compare well with others, it's a signal that action should be taken. If your record, on the other hand, begins to show a drop from a previously high level, it is again a signal for action.

2. Along with how you stand, it is equally important to know what you are aiming at. The answer, of course, is maximum safety, but unless you are thoroughly familiar with the way it is judged and recorded, you are still operating somewhat in the dark. A thorough knowledge of the meaning of safety terms and standards therefore is essential to getting results.

3. Many mine accidents, as a result of luck, never result in an injury or death. However, they could—except for luck. Therefore, a roof fall, a wreck or a gas pop should be investigated and investigated thoroughly to prevent a repetition, because the next time luck might not be present. The rule is: Prevent the accidents and you prevent the injuries.

4. Unsafe conditions and unsafe practices inevitably result in injury or death. A good way of making sure that unsafe conditions and unsafe practices are kept out of the picture is to check regularly and write down what you find. Then you are sure that you are in good shape or, if you're not, you have the information you need to find the remedy.

5. Lack of proper supplies affects safety results just as much as it affects production. The answer is to make sure that you always have timber, for example, on hand all the time. Then, there is less likelihood that a man will be caught under a rock fall. Of course, it is even more important to make sure that the material, such as timber, is used when and where it is needed.

6. If a man can stick his hand in a gear, the chances are that it will happen sooner or later. Therefore, maximum safety is attained only when all the proper safeguards are in place and in condition to do the job. That goes for trolley guards, fuses, mats in front of electric switches and so on.

7. If you own a first-aid manual, the conclusion is that you have taken first-aid training and therefore have better fitted yourself to really work for safety. If you haven't had first-aid training, you should by all means make arrangements to get it.

8. When men horse around and play jokes on each other—particularly jokes that could result in injury or death, like wiring up a dinner bucket—it is a sign that they are a long way from appreciating the value of safety work and, incidentally, the benefits of doing a good day's work. Horseplay on the job is a signal for the supervisor to go into action.

9. Obedience to the safety rules and nothing more is not the best of foundations for a really effective safety program. Unless men are sold on the idea and are thinking about safety work, the maximum results cannot be attained. Perhaps one of the biggest job's for the foreman interested in getting safety results is creating interest and cooperation on the part of his men.

10. One narrow escape might be a result of circumstances that could not be foreseen. But if a foreman has several in a rather short space of time, he should begin to ask himself if he is practicing what he might be preaching. In fact, that is a good question even if he doesn't have to dodge rocks and runaway cars. Setting a good example is a major factor in safety results. To set a good example, of course, the foreman must himself be sold on safety and must be familiar with the law, the code, the company rules and the general principles that underlie effective safety work.

660 TIMKEN®-equipped cars still going strong after more than 20 years' service

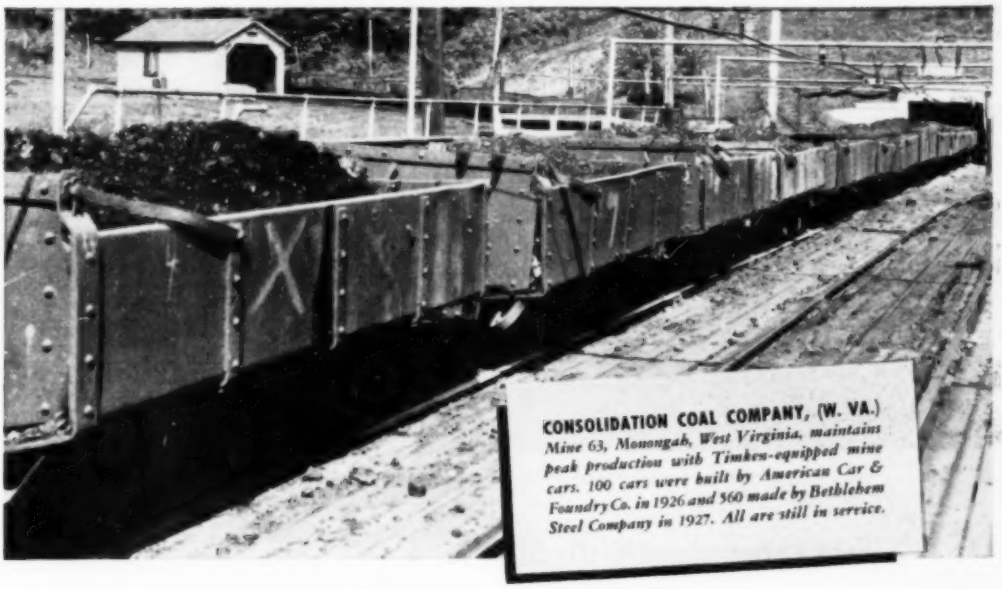
FOR over 20 years, 660 Timken® bearing equipped cars have helped Consolidation Coal Company (W. Va.) move maximum tonnage at minimum expense at their No. 63 mine. And these cars are still going strong!

Timken bearings on the axles permit easier starting, higher speeds, less power lost due to friction. They enable locomotives to haul more cars and more coal per trip. And they help keep maintenance expense at a minimum.

Due to their tapered design, Timken bearings take both the heavy radial and the severe thrust loads encountered on rough, winding mine tracks. They roll freely and frictionlessly under the toughest hauling conditions. Effective closures keep lubricant in, resulting in reduced time out for lubrication. Timken bearings are built to last as long as the cars themselves.

For peak production at minimum cost in your mine, get Timken bearings in every new mine car you buy. Look for the trade-mark "Timken" on the bearings you use. The Timken Roller Bearing Company, Canton 6, Ohio. Cable address: "TIMROSCO".

This symbol on a product means its bearings are the best.



CONSOLIDATION COAL COMPANY, (W. VA.) *Mine 63, Monongah, West Virginia, maintains peak production with Timken-equipped mine cars. 100 cars were built by American Car & Foundry Co. in 1926 and 560 made by Bethlehem Steel Company in 1927. All are still in service.*

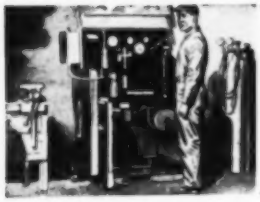
TIMKEN BEARING CAPACITY RATINGS INCREASED 25%.

Since Timken bearings were last re-rated some 15 years ago there has been such a further and constant improvement in quality that we are now able to announce a 25% increase in radial and thrust load carrying capacity. This may make possible the use of smaller bearings with savings in bearing cost, material cost and weight. Engineers will be able to utilize the advantages of Timken bearings in more applications than in the past.

A new Timken Engineering Journal, now in preparation, will give you complete capacity rating tabulations. For further assistance, write us today.

TIMKEN
TAPERED
ROLLER BEARINGS

NOT JUST A BALL — NOT JUST A ROLLER — THE TIMKEN TAPERED ROLLER — BEARING TAKES RADIAL AND THRUST — LOADS OR ANY COMBINATION



Operating Ideas

Low-Seam Tripod Simplifies Top-Rock Drilling

A SPECIAL TRIPOD in use at Mine No. 3-B, Amherst Coal Co., Accoville, W. Va., permits one man, without tiring physical work, to drill holes that formerly required two and sometimes three men. The unit was designed and built by E. F. Brown, formerly chief electrician, who is now chief electrician for the Elk Creek Coal Co., Emmett, W. Va.

In 3-B mine, where the seam averages 39 in. in thickness and ranges from 34 to 40 in., it is necessary to drill and shoot top to make height for the elevators or booms that transfer the coal from the shuttle cars to mine cars. Drilling holes at an angle into the low roof was a tiring job and required at least two men to hold the jackhammer. Now, the tripod does all the holding and one man advances the drill by turning a crank.

The tripod legs, consisting of 1½ x 2x¼-in. angles 38 in. long are pivoted at the top and both the tripod height and angle of drilling are adjusted by a tie bar notched to accommodate a height range of 26 to 38 in. Pointed spikes welded to the bottom of the angles keep the tripod from slipping. The sliding rack supporting the drill is pulled upwards by a ¼-in. wire rope wound on a 1½-in. drum. In moving the unit, the drill is dismounted and the tripod legs folded together in a compact package that one man can easily handle.

DRILL-HOLDING TRIPOD set up to drill top rock at an angle where seam height is only 36 in.

Freezeproofing With Salt

"IN WINTER," C. D. Cuffe, vice-president, Worcester Salt Company, points out, "coal cars frequently must pass through rain or snow storms. When so exposed, a sudden drop in temperature often will cause the coal to freeze solidly in the car. A great deal of hard labor then is required to get the car unloaded.

"To minimize such difficulties, a good plan is to add salt to the coal as it is being loaded. When rain or snow occurs a brine is formed and brine will not freeze as quickly as water. In fact, a saturated brine will not freeze short of zero Fahrenheit, and consequently provides over 30 deg. of protection.

"Water will hold one-quarter of its weight of salt but since it is impossible to predict how much precipitation will occur on a car of coal enroute, a safeguard is to spread medium-grained salt on the coal as it is being loaded in an amount at least half the weight of the natural moisture content of the coal as determined at the mines. This allows for rain or snow on the coal to an amount equal to the natural moisture already in the coal before the maximum protective action of the salt is impaired.

"Such salt treatment has a secondary effect of reducing dust production after the coal is dry and consequently would be appreciated by the users."

Ideas Pay Off

IN COAL MINING, ideas pay off in a big way—that's why many readers consistently study this section with interest and profit. And that's why publication here of your successful operating, mechanical, electrical or safety ideas will bring you appreciation and "credit" from others in the industry. Remember, it's the idea that counts—we'll gladly have your sketch redrawn and rewrite your description, if necessary. COAL AGE, on publication, will pay $5 or more for each accepted.

OVER 250,000 FEET NOW RENDERING SATISFACTORY SERVICE

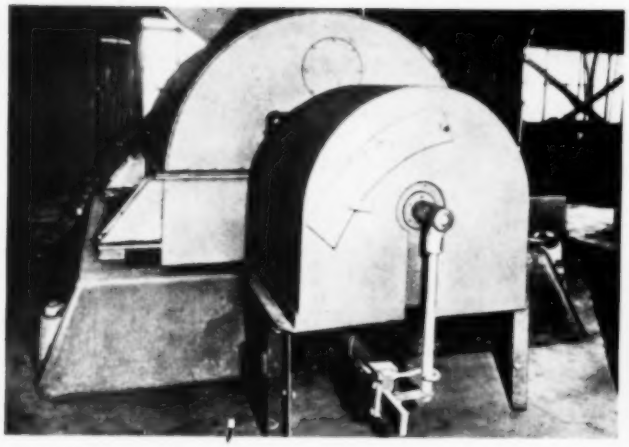
- KING KOAL underground CONVEYOR BELTING was developed and is being manufactured by Hamilton Rubber Mfg. Corp., to keep pace with the advent of underground conveyor belt systems.
- In every KING KOAL BELT is incorporated the essential qualities for economical conveying of coal with the positive assurance of long and uninterrupted service.
- For the ultimate in coal mine conveyor belting, specify KING KOAL CONVEYOR BELTS by

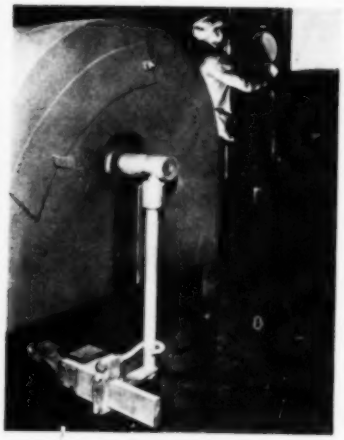
We will gladly submit a sample upon request.

ADVANTAGES

- Resists severe impact . . .
- High tensile strength
- Flexibility
- Troughs easily
- Won't gouge easily
- Mildew-proof, won't rot
- Excellent for long and short hauls, also slope
- Runs true on idlers
- Unaffected by mine acids or alkalies

HAMILTON RUBBER MFG. CORP., Trenton, N. J.
MANUFACTURERS OF QUALITY RUBBER PRODUCTS FOR OVER 70 YEARS





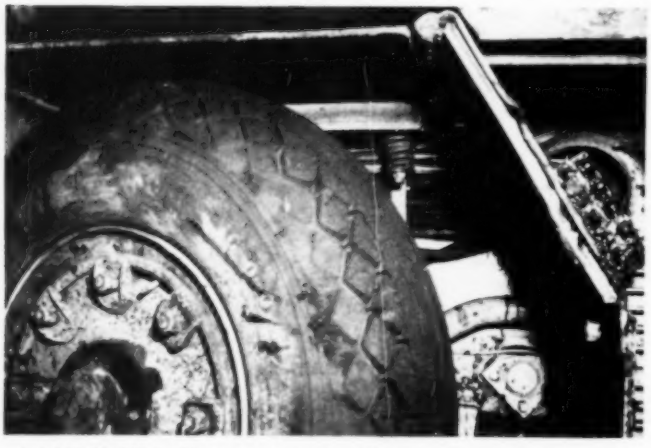
CHANGE OF TORQUE on the main shaft of the filter (left) varies the strain in the force beam below and changes the electrical resistance of the strain gage bonded to it. The hook is a safety guard. Right is a close-up of the force beam and strain gages, with the recording controller in the rear.

Automatic Filter Control

TINY, HIGHLY sensitive electrical resistance is used for automatic control of the operation of Bird centrifugal filtering equipment at the Champion preparation plant of the Pittsburgh Coal Co., Imperial, Pa. The complete load-sensitive unit, supplied by the Baldwin Locomotive Works, consists of a "Load-Beam" on both sides of which special "SR-4" gages are bonded. These gages, consisting of fine wire grids, are baked on the Load-Beam—in this instance a 4x1-in. steel beam approximately 15 in. long—and are covered with a protective Neoprene coating and a metal sheath. The Load-Beam is mounted as a cantilever on a bracket that extends outward beneath the gear box parallel to the main shaft of the filter. The gages are wired to a Foxboro "Dynalog" recording controller.

The torque required to convey coal through the filter is transmitted to the Load-Beam by a vertical arm that pulls on the beam through a flexible link and strains the outer fibers to which the SR-4 gages are bonded, thus changing their electrical resistance. This change of resistance affects the electronic control circuit and is translated into pounds of load on the recorder chart for the information of the supervisor. If the filter load exceeds a set value, such as 15 percent above normal, the feed is cut off automatically until the machine has cleared itself. If the load continues to increase, however, beyond a maximum safe value, the feed not only is cut off but the machine is stopped. The same thing occurs if the torque load drops to zero, as when a shear pin breaks in the drive. At Champion, the Load-Beam is set at a 300-lb. force.

Hinged Fenders Save Maintenance on Shuttle Cars



HINGED FENDER PLATE over shuttle car wheel is held in a normal position by springs.

INSTALLATION of hinged fenders, which yield when wedged against the roof and then return to normal position when the pressure is removed, has reduced lost time and cut maintenance on rubber-tired shuttle cars operating in Mine No. 3-B, Amherst Coal Co., Accoville, W. Va.

The top plates of the driving-wheel fenders of the 32E shuttle cars, operating in a working height averaging 39 in. and ranging from 34 to 40 in., formerly often required straightening after they had been bent down against the tire treads by lumps of coal wedged between the fenders and low roof.

As shown in the accompanying illustration, the top plate was cut loose at the ends and hinged at the inside edge. Coil springs hold the plate in a normal horizontal position, but permit it to be temporarily depressed when lumps are wedged between it and the roof and otherwise would cause damage requiring time-consuming repairs.

SOUND CONSTRUCTION ASSURES

LONGER SERVICE LIFE

FROM TIREX PORTABLE CABLES

Simplex-TIREX Portable Electric Cables are carefully designed with an eye opened wide to the exacting and, very often, abusive conditions under which they must work. Toughness, flexibility, and safety are given top consideration and the result is a cable construction suited to day-in, day-out operation wherever the going is tough.

Check the advantages of this construction now. Keep them in mind. And next time you need cables for use on any portable electric equipment from hand tools to heavy shovels, remember to specify TIREX and profit by the dependable, low-cost cable service these features provide.

Conductors of TIREX Cables consist of small copper wires properly stranded together to provide non-kinking flexibility.

Conductor Insulation is a rubber compound having stable electrical properties and the mechanical strength necessary to withstand rough usage.

An **Inner Jacket** of durable rubber applied over the assembled insulated conductors forms the inner part of a tough protective covering for TIREX Cables. It provides a cushion for the conductors and protects them from mechanical shock whenever a cable is twisted or crushed.

Two **Seine Twine Serves**, hard-twisted for strength, are wound over the inner jacket to reinforce the protective covering and give it added wearability.

An **Outer Jacket** of Selenium Neoprene completes the construction. During vulcanization it is fused with the inner jacket and seine twine serves to produce a single, reinforced covering that is unexcelled for protection against abrasion, corrosive chemicals, weather hazards, sunlight, heat, and flame. It is not easily cut or worn and assures safe handling.

Simplex-Tirex

SIMPLEX WIRE & CABLE CO., 79 SIDNEY ST., CAMBRIDGE 39, MASS.

Knockdown Hoist Rigging Fits Truck Cab

HOIST RIGGING FOR TRUCK CAB, home designed and shop built, makes it easy to raise or lower heavy transmissions.

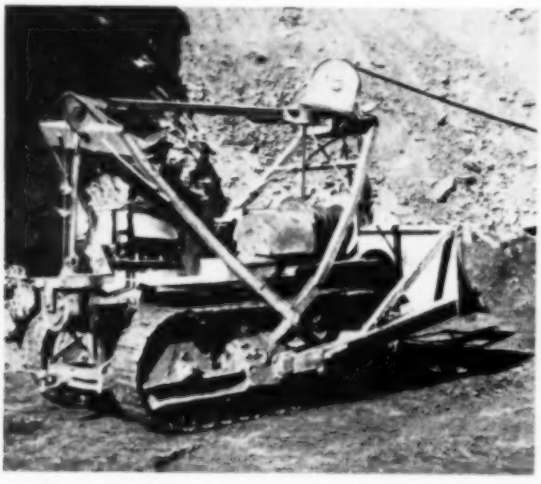
ASSEMBLY OR KNOCKDOWN inside cab requires only two minutes. The two halves are sturdily joined by two union joints.

HEAVY TRUCK transmissions are lowered to the garage floor for repair and raised into place after overhaul by a portable hoist rigging designed by Ralph Sanders and built in the shop of Pittsburg & Midway Coal Mining Co., Scammon, Kan. The rigging framework pictured here is made in two halves, one half being designed to fit the front interior of the cab and the other to fit the rear interior. Each half is welded as a unit of $1\frac{1}{2}$-in. steel pipe and is braced by a small underslung truss, as shown. The hoist beam fits snugly over the two halves when they are joined, allowing the mechanic to move the chain hoist freely back and forth as desired.

To lower or raise a transmission, the two halves of the rigging are placed fore and aft in the cab, each of the four legs finding its proper place just above one of the strong, lengthwise beams of the truck. The two halves then are joined by union joints in the two horizontal members running lengthwise the truck. Once the rigging is erected inside the cab, the hoist beam is placed directly above the transmission, the chain hoist itself being supported by a single-roller carriage that moves along the beam.

The rigging can be assembled or disassembled inside the cab in two minutes, Mr. Sanders states.

Electric 'Dozer Works With Stripping Shovel



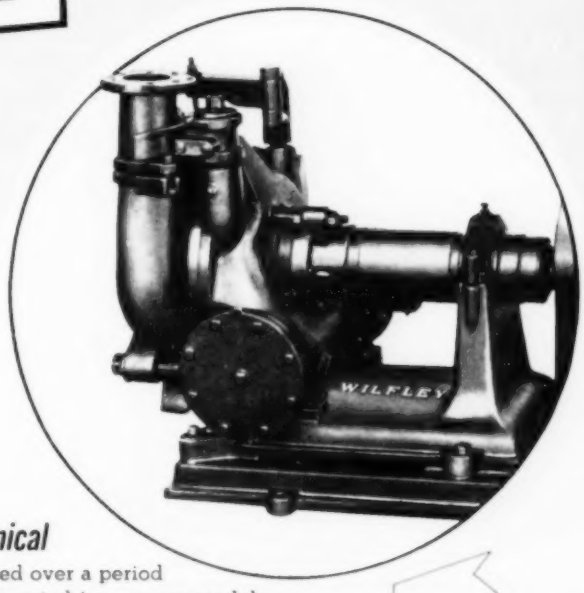
CABLE-REEL BULLDOZER drawing power from the stripping shovel, gives quiet, dependable service.

POWER OUTLET on shovel platform feeds 440 volts from transformers to bulldozer motor.

A D-7 CATERPILLAR TRACTOR equipped with a LeTourneau 'dozer blade and powered by a 75-hp. G. E. motor cleans up behind the stripping shovel at the Broken Arc Coal Co., Okmulgee, Okla. To convert the tractor from diesel to electric power, a cable reel holding up to 250 ft. of cable was built in the mine shop and installed on the 'dozer, as shown in the accompanying illustration. Power is drawn from either of two outlets built onto the shovel platform, one at front and the other at rear, as shown in the right photograph. Transformers beneath the shovel platform step the voltage down from 2,300 to 440 volts to serve the 'dozer.

The motor is said to supply all the power needed for the light work ordinarily done by the 'dozer in the pit. Quiet, dependable operation is the chief advantage claimed for the electric-powered 'dozer.

Gives You a Definite **STEP UP** **...in efficiency**



Many new mechanical improvements, developed over a period of years, are now incorporated in our new models. These tested improvements give ever-increasing efficiency and reliability to WILFLEY pumps. Our years of experience and accumulated knowledge are now reflected in worthwhile power savings and stepped-up production. The WILFLEY design is especially adapted to the successful use of rubber. Otherwise, wear parts are made of alloy iron, alloy steel and other materials individually engineered and selected for cost-saving efficiency on your job. An economical pump-size for every purpose. Write or wire for specific information that will help reduce YOUR costs.

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SHORTWALL CUTTER, turned on its side, digs 30-in. trenches prior to shooting.

LUMP COAL OUTPUT is boosted by trenching stripped coal seam, thus filling local demands for large sizes.

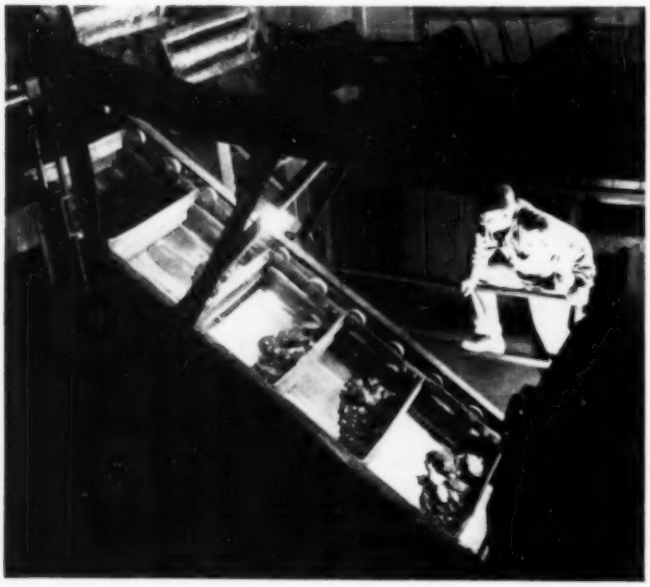
Cutter Boosts Lump Output From Strip Mine

A SULLIVAN shortwall cutting machine, turned on its side to trench the coal prior to shooting and loading, increases the percentage of 12-in. and larger lumps at the Old Mac Coal Co., Red Oak, Okla. In view of the local demands for lump sizes, this is a distinct operating advantage.

Working a 26-in. seam that pitches about 15 percent, the dragline makes a cut about 100 ft. wide. A pit bulldozer and a brush clean off the uncovered coal behind the dragline. Then the cutting machine, operated by Wiley Johnston and shown in the accompanying photograph, shears three trenches 30 in. deep on 25-ft. centers, the two outer trenches being about 25 ft. from the highwall and the spoil bank respectively. Power for the cutting machine is transmitted by cable from the loading shovel.

After the trenches are cut, holes for blasting the coal are drilled on 7- to 8-ft. centers and the coal is shot. The result is a high percentage of big lumps, as shown at the right.

Alloy Prolongs Chute and Conveyor Life



INAUGURATED with the placing of an order in August, 1947, a program of installing special heat-treated alloy plates in conveyors and chutes is materially reducing maintenance and repair costs at the preparation plant serving the Maiden mine of the Kelley's Creek Colliery Co., Maidsville, W. Va. The "Jalloy" plates, produced by Jones & Laughlin, were installed in the conveyor to the wash box, in the chute from the conveyor to the box and in the bottom of the launder.

Conveyor bottoms and sides, it recently was reported, had lasted a year and were expected to go at least two, compared to three months or less for mild-steel plate. Plates in the bottom of the chute had gone 10 months, where mild steel lasted a month at the maximum. The conveyor and chute handle an average of 4,600 tons of coal a day.

F. L. BAKER, tipple foreman at Maiden mine, inspects the special plates used in the bottom and sides of this conveyor. A life of a year already had been recorded, compared to three months for mild steel.

Save on maintenance costs

Simplify lubricant storage and handling

Eliminate application errors at the face

with

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—for lubrication of cutting and loading machines

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GULF INDUSTRIAL LUBRICATION

Suggestions for Effective Bronze-Welding

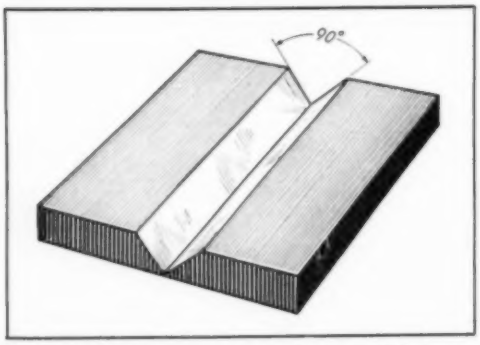


FIG. 1—FOR METAL over ¼ in. thick, make about a 90-deg. angle. You may need only a coarse file, but for heavy sections of cast iron, you probably will need a power grinder; for steel castings, a cutting blowpipe or gouging nozzle.

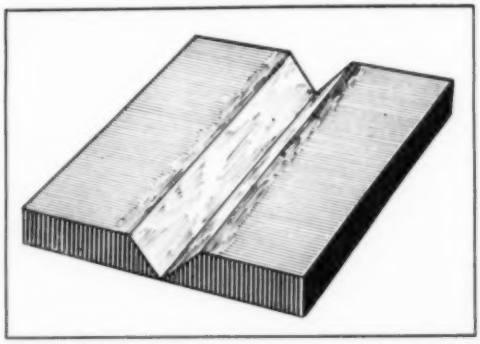


FIG. 2—THOROUGH CLEANING is one of the secrets of a good weld. Remove all oil, grease, scale, rust or oxide from the beveled edges. Clean the top surface for about ½ in. back from the edges. Use a grinder, stiff wire brush, file, emery cloth or steel wool.

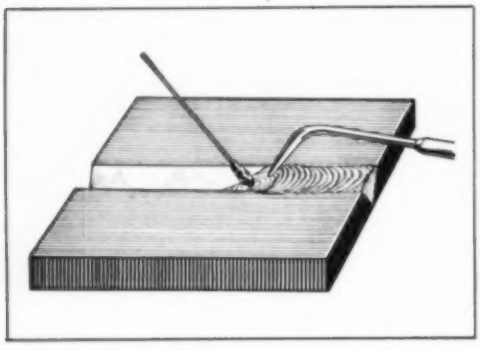


FIG. 3—BEVELED SURFACES also must be cleaned by using a liberal amount of flux. Add the flux by dipping the end of the hot rod into the flux can. A bronze rod precoated with flux helps, because you are sure of getting exactly the right amount.

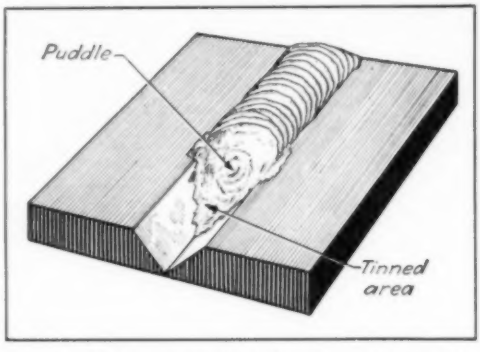


FIG. 4—TIN THE SURFACE ahead of the main rod deposit when the metal is at the right temperature and thoroughly clean. If the metal is not hot enough, the bronze rod will form into drops. If too hot, the rod will boil and form into little balls.

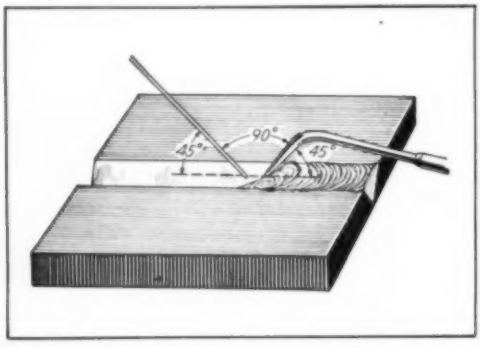


FIG. 5—POSITION of blowpipe and rod is another secret to be remembered in making good bronze-welds. For a weld in a flat position, hold both rod and blowpipe at about a 45-deg. angle to work.

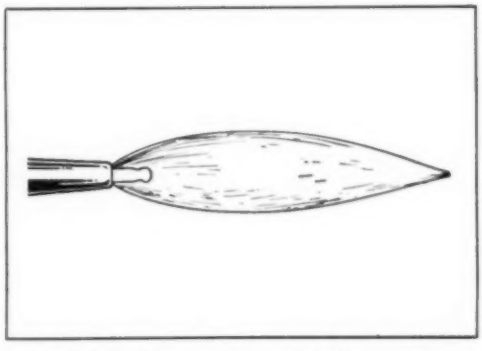
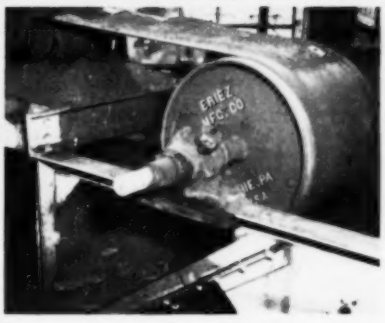


FIG. 6—ADJUST the flame until there is a slight excess of oxygen. The oxidizing flame has a bluish outer envelope and a shorter inner cone than the neutral flame. There is no secondary flame or feather.

—Reprinted from Linde Tips, The Linde Air Products Co

After *Eriez* Installation.. No Customer Complaints from Tramp Iron ~



Eriez Non-Electric Permanent Magnetic Pulleys Automatically Remove Tramp Iron from Coal

Close up of a 24" diameter pulley. Eriez Permanent Magnetic Pulleys are available in 78 sizes ranging from 12 to 36" diameters and in belt width up to 72"

Today buyers demand coal free of tramp iron—and with the increase of mechanized mining, the problem of removing iron is one of major importance. Eriez Permanent Non-Electric Magnetic Pulleys are designed to do the job efficiently, economically and automatically. Look at the installation above. Here an Eriez pulley has been placed in the stoker coal conveyor line, at the last possible point where iron can get into the coal. This user is assured of customer satisfaction—there will be no iron in his product to cause complaints and possible loss of good accounts. There are many advantages that only Eriez Permanent Magnetic Pulleys can give you. Eriez units are completely non-electric—no electricity is necessary. There's no maintenance or upkeep expense—once installed the magnetic strength will last indefinitely—operating at full power 24 hours a day with never a chance of burn-out or loss of strength and there's no conversion from AC to DC.

You'll find that Eriez Permanent Non-Electric Pulleys are the answer in reducing mine operating costs, keeping customer goodwill and improving the quality of your coal.

Write today for full information and the names of the many outstanding mines who have already converted to the modern Eriez method of tramp iron removal.

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News Round-Up

Second Gasification Project Scheduled for Early Test

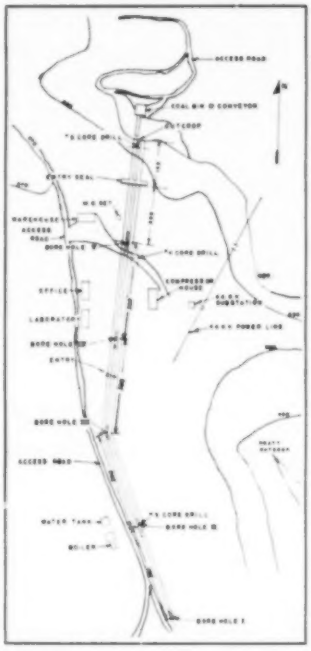
THE SECOND STAGE in experimental gasification of coal underground was to get under way soon after March 1 at Gorgas, Ala., where a large block of coal under cover averaging 120 ft. has been set aside jointly by the Alabama Power Co. and the U. S. Bureau of Mines to carry forward studies and observations first begun in 1947 in a smaller block of coal under very light cover. The Gorgas project falls within the Bureau's synthetic-liquid-fuels program. The specific goal at Gorgas is not to produce high-B.t.u. gas, but to obtain a gas of constant heating value with a consistent balance of hydrogen and carbon monoxide for use either as a fuel or in the production of synthetic liquid fuels.

Headings Total 1,500 Ft.

The surface facilities now installed, including offices, laboratory, instrument room and a compressor building, are grouped about two miles east of the site of the first underground gasification experiment. The coal that will be burned underground is a part of the Pratt seam, about 48 in. thick in this area. The coal block, near the surface facilities, extends in a north-south direction under a steeply sloped ridge, with cover ranging from 120 to 160 ft. The outcrop at the north end has been cut back until the overburden is about 60 ft. deep. From that point, two parallel headings 10 ft. wide have been driven 1,200 ft., with a 10-ft. pillar between and with crosscuts every 300 ft. The inby 600 ft. of driving forms a dog-leg turning about 10 deg. to the left from the outby 900 ft., and includes a single butt heading 300 ft. long from the center of the last crosscut. Turning the last part of the opening was done to follow the contour of maximum cover.

At the inby end of the single butt heading and at the center of each of the four crosscuts, a borehole extends from the coal to the surface, where it is sealed and fitted with valves and pipe for feeding air into the burning area or for drawing off gases to the surface. These boreholes, numbered one through five from south to north, were drilled with churn equipment and brick was laid at the bottom to support the casing. Holes 2, 3 and 4 are 28 in. in diameter and are lined with 20-in. carbon-steel pipe, the pipe lining being grouted in the borehole with refractory cement. Holes 1 and 5 are 18 in. and have no lining.

In all instances, the borehole area was pressure-grouted before the large hole was drilled. This was done through four 6-in. holes drilled 4 ft. from the center of the borehole and 90 deg. apart. Cement grout then was forced into the strata. Between Boreholes 1 and 2 a series of 6-in. test holes have been drilled. These holes can be used to determine the extent of combustion at right angles to the line of the entry. They are fitted with thermocouples to measure burning temperatures underground, which are expected to exceed 3,000 deg. F. Seals at the top of each borehole have been fitted with water sprays to reduce gases to about 800 deg. F.



LAYOUT of the second underground-gasification project scheduled to get under way shortly at Gorgas, Ala.

Primary air for burning underground will be provided by a reciprocating compressor, driven by a 300-hp. electric motor, with capacity of 7,200 c.f.m. at 30 p.s.i.g. Standby air sources are a 1,500-c.f.m. blower (10 p.s.i.g.) and a 7,000-c.f.m. blower (2 p.s.i.g.)

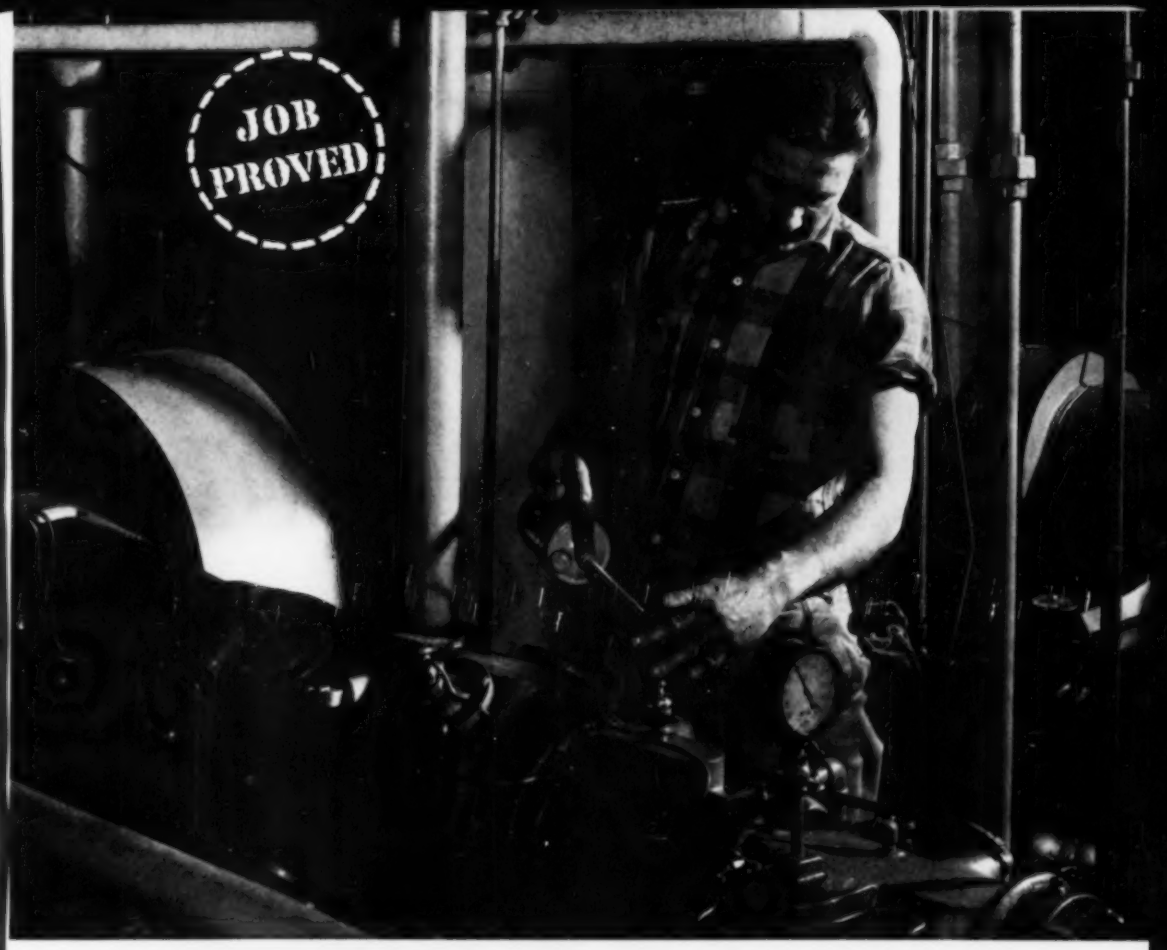
An entry seal extending 25 ft. on each side and reaching to a height of 10 ft. has been provided 145 ft. inby the outcrop. Firebrick is laid in three courses to make this seal.

Gas Take-Off Flexible

The coal will be fired at Borehole 1 and air will be admitted at the same place. Product gases will be exhausted first through Borehole 2, all other outlets being sealed off. If carbon-monoxide concentration should be low, gases will be drawn off through Borehole 3, Borehole 2, Borehole 1, or at the portal, depending on which point provides enough time for reduction of excess carbon dioxide to carbon monoxide. With such flexibility, it is hoped that the optimum length of path can be determined.

It will be possible, it is believed, to drill vertical boreholes at appropriate locations for use as air inlets to propagate gasification over a wide tract of coal. At any rate, this method will be tried and the extent of the burning will be carefully measured.

Marking the wide attention being paid to this project, about 75 representatives of widely scattered business and industrial interests visited the Gorgas site during the week of Feb. 14 at the invitation of the Alabama Power Co. and the Bureau of Mines, and were conducted over the project by Milton H. Fies, manager of coal operations, Alabama Power Co., and James L. Elder, supervising engineer, U. S. Bureau of Mines. Interests represented at the week-long showing included coal production and preparation, railroads, chemicals, coal and other industrial research, public schools and colleges, machinery manufacture and design, engineering, labor, and state and federal governments.



UNDER PRESSURE 11 YEARS...STILL GOING STRONG

A Sun Oil Helps Keep Compressor on the Job 16 Hours a Day—No Hard Carbon Forms

The "lungs" of a forced ventilation system in a large industrial plant are two-stage air compressors—pumping air through the system at 300 pounds per square inch.

One of these compressors, now over 11 years old, has been running 16 hours a day since its installation. From the start, a Sun lubricant has been used to lubricate crosshead and air cylinder. During the past five years there has been but one shutdown . . . and that occurred when a different brand of oil was used by mistake!

Operating on the Sun lubricant, the compressor is running as well today as ever. No hard carbon has formed. As a result of this record the plant has standardized on Sun lubricants for all its air compressors and vacuum pumps.

This performance is typical of the advantages gained from "Job Proved" Sun lubricants in thousands of industrial plants. Further information can be had from any Sun Office. For a copy of the booklet "Lubrication of Air Compressors and Pneumatic Tools" write Department CA-3.

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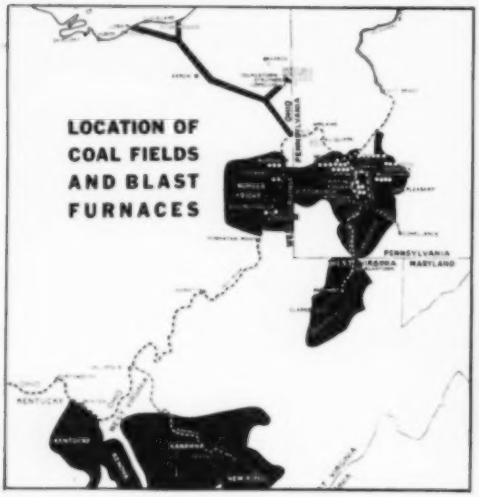
Coal Transportation Costs to Lake Erie to Be Cut With . . .



PROPOSED ROUTE of the new two-way 103-mile belt conveyor from the Ohio River to Lake Erie. Hauling coal north and iron ore south, the new line, including spurs to Youngstown and Cleveland, reportedly will save from $20,000,000 to $45,000,000 yearly in freight rates.

MODERN COAL-WASHING PLANT, being planned as feature of the new project to clean and size untreated coal en route, is expected to encourage increased production and development of new mines now held back by the cost of such preparation facilities.

ONE OF FIVE CONTROL POINTS at key junctions and terminals, from which engineers will have pushbutton control of the entire system. The line is being planned for a capacity of 3,400 tons of coal and 5,400 tons of iron ore per hour.

CUTAWAY VIEW of a typical transfer point on the system, which will require 172 separate belts on the 103-mile main line. The two belts will be fully enclosed within an elevated metal gallery that will have a minimum clearance of 22 ft.

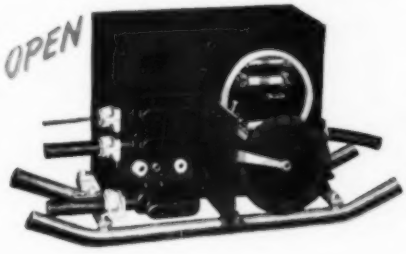
103-Mile Conveyor to Haul Coal and Ore

PLANS FOR THE CONSTRUCTION of an overland two-way belt-conveyor system between the Ohio River and Lake Erie for the transportation of coal and iron ore, by the newly formed Riverlake Belt Conveyor Lines, Inc., Akron, Ohio, were announced Feb. 10 by H. S. Stewart Jr., president, Akron, Canton & Youngstown R.R. The main line of the system, which is expected to cost a total of $210,000,000 will extend from Lorain, Ohio, on Lake Erie, to a terminal on the Ohio River near East Liverpool, a distance of 103 miles. Spur lines serving Youngstown and Cleveland will make a total of 130 miles for the system.

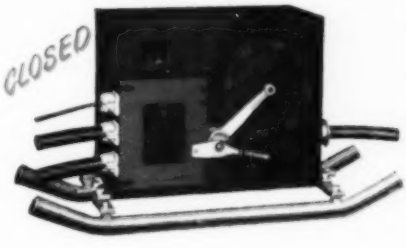
Describing the conveyor line, designed to handle bulk cargoes only, as the "railroad of tomorrow," Mr. Stewart pointed out that the system would save from $20,000,000 to $45,000,000 annually in freight rates on iron ore, limestone and coal consumed by steel mills and other industries in eastern Ohio and the upper Ohio River valley, including Pittsburgh. The project will be financed by private capital, with no stock being offered to the public. Its construction is expected to require a minimum of three years.

Iron ore moving south from the lake and coal north-bound from the river are in sufficient volume, Mr.

Fool-Proof Interlock Prevents Opening O-B Distribution Boxes with Power "On"



It can't be opened with power "on." When the disconnect switch is closed, the position of the operating handle prevents access to either plug box or fuse compartment.



Safety is made an integral part of O-B Permissible Distribution Boxes. Because of an ingenious interlocking arrangement, branch circuits can be plugged into the boxes only when the power is off. Fuse compartments, as well, cannot be opened unless the incoming power circuit is broken. There's no chance for loss of memory—only with the disconnect switch **opened** can access be gained to the inside compartments of the box.

Play safe . . . protect your workmen and your tonnage . . . use O-B Permissible Distribution Boxes at the face and other locations requiring several individual power circuits. Employing reliable cartridge fuse protection, O-B boxes are available with connection facilities for either two or three branch circuits. For complete engineering data, fill out and mail the attached coupon today.

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M.S.A. to Build New Safety Research Laboratory

CONSTRUCTION of a modern research laboratory, planned to be the largest in the world exclusively devoted to the development of safety equipment for mines, industry and public service organizations, is to be immediately undertaken by the Mine Safety Appliances Co., Pittsburgh, Pa., according to an announcement Feb. 10 by George H. Deike, M.S.A. president. The four-story building will be dedicated as memorial to John T. Ryan, an international pioneer in safety for mines and other industries, who, with Mr. Deike, founded M.S.A. 35 years ago.

Scheduled for completion in September, the new laboratory will be located within a block from the company's Pittsburgh plant. Its facilities will be made available to all industry for investigation of safety-equipment problems affecting health and property, Mr. Deike said. Activities of the scientists there will be coordinated with those of the U. S. Bureau of Mines, U. S. Public Health Service, Industrial Hygiene Foundation of Mellon Institute, Harvard School of Public Health, and the new School of Public Health at the University of Pittsburgh and fellowships at other leading universities.

A research institute of this scope has been planned by the company for more than five years, Mr. Deike said. Although the company has always engaged in such work, the new structure, consisting of about 24,000 sq. ft. of floor space, will provide more adequate facilities to expand its activities. Planned to be as modern and up-to-date as possible, the laboratory will have many types of instruments and equipment to conduct research in various branches of science, particularly chemistry, electricity and physics, it was reported. It will be in charge of Dr. William P. Yant, director of research and development for the company since 1936.

John T. Ryan, for whom the building is being named, died in 1941. Starting as a "trapper boy" in coal mines at Dudley, Pa., at the age of 12, he worked in mines to finance his education. In 1908, he received a degree of mining engineer from Penn State College and later, the advanced degree of engineer of mines from the same college. Following experience as a mine superintendent for several coal companies, he became an assistant mining engineer for the U. S. Bureau of Mines in Pittsburgh. In 1915, he and Mr. Deike, also with the Bureau, formed a partnership and started the Mine Safety Appliances Co. His son, John T. Ryan Jr., now is executive vice president.

Stewart said, to pay off the construction cost in 20 years, while at the same time permitting rates low enough to save from 50c to $1.50 a ton on the present transportation costs of coal and from 47c to 68c a ton on iron ore delivered to steel mills in Youngstown and Pittsburgh. Minimum cargo volume required will be about 30,000,000 tons, possibly divided equally between coal and iron ore, but the system will have a total capacity of 52,000,000 tons, at which volume the maximum savings will be passed along to the consumers.

Among the features of the new project will be a coal-washing plant that will clean and grade untreated coal en route and modern terminal facilities at both ends of the line. These facilities are expected to cost $56,000,000 of the total. "Only one-half to two-thirds of the bituminous coal produced today is properly treated and graded before leaving the mines," Mr. Stewart said, "and the high cost of installation of cleaning equipment at the mines is retarding expansion of production in many coal fields. Our washing plant will pave the way for increased production that will be necessary in existing coal fields to supply our line, and it will lead to extensive new mining operations where installation of washing equipment is prohibitive."

The Pittsburgh, Connellsville and Fairmont fields on the Monogahela River, together with the No. 8 field in Ohio, are the most logical sources of coal for the new system, Mr. Stewart pointed out, estimating that 18,000,000 tons of additional coal would be required yearly from these fields or other sources available to river barge lines. Large stockpiling and storage areas are planned along the line, which will permit the mines to operate steadily throughout the year.

Ohio River traffic will be almost doubled, Mr. Stewart said. Added to the 18,000,000 tons of new coal a year would be 15,000,000 tons of iron ore. The total of all barge cargo in 1946 was just short of 36,000,000 tons.

Among the far-reaching economic results of the new transportation line, according to Mr. Stewart, is the stabilization of the steel industry in its present location. "This essential steel capacity must be preserved," he said. "With freight rates constantly rising, the future outlook at the moment is not assuring. Cheaper coal and cheaper iron will retain plants in localities where now there is some danger of curtailed operations and even the possible loss of the industry. The lower cost of the basic commodities may lead to increased production in many instances instead." Attraction of new industry to the region also was predicted.

The many engineering phases of the project are in an advanced stage of planning, it was reported. Belting engineers of the Goodyear Tire & Rubber Co. and the Link Belt Co., along with various other construction, transportation and electrical experts, have been working on it for several months.

The elevated structure will have a minimum clearance of 22 ft. and the belts will be fully enclosed within a metal gallery. The electrically operated belts will be controlled by a pushbutton system, equipped with an electric-eye warning device able to locate distress points and stop the entire system immediately.

The 103-mile two-way main line will require a total of 172 belts, some over a mile in length. A 72-in. belt will carry the coal north at a rate of 600 f.p.m., or 3,400 t.p.h. The 60-in. south-bound belt operating at the same speed will carry iron ore at 5,400 t.p.h. The 19-mile 35-flight Youngstown spur will leave the main line near Salem and will be only a one-way conveyor. The nine-mile Cleveland spur will branch off near Parma and will include 10 belts. Belts sizes planned include a 72-in. line north of the Ohio River to the Youngstown spur point and a 60-in. line on northward to Lorain. The spur belts will be 42 in. wide.

THE LARGEST COAL CLEANING PLANTS OF THE WORLD ARE EQUIPPED WITH THE . . . CHANCE SAND FLOTATION PROCESS

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79 Foremen Whose Crews Worked Year or More Without Accident . . .

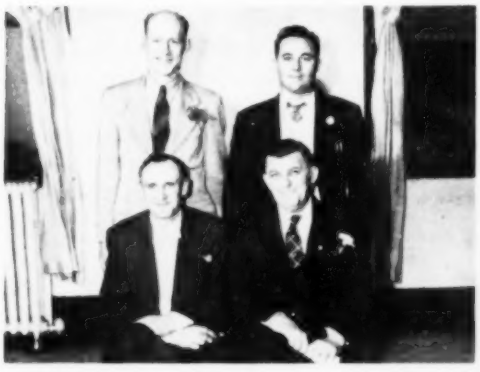
RED JACKET FOREMEN whose sections had no lost-time accidents for the year 1948—kneeling: Don Shields (left), Ernest Stallard, Wm. McClure, Howard Radford, Gussie Morgan, Kenneth Smith, John Spradlin, William Carey, Dan Winters and Amon Workman; sitting: Wayne Simpkins (left), A. A. Mankin, Emory Osborne, Homer Mahone, C. L. Eanes, F. N. Bensey, Jerry Ison, George Ritter, John Fowler and Luther Dillon; standing: Ottie Trent (left), Joe Browning, Sephas Wicker, Ance Kennedy, W. O. Bohon, Dayton Johnson, A. K. Hooker, Rufus Sipple, Ralph Staten, Nathan Maynard, Mont Howell, Tommy Bailey, Richard Collins, E. K. Toler, Clyde Morgan, Fred Sears, J. E. Hagaman, and Fred Shannon.

PERFECT SAFETY RECORDS FOR 1947 AND 1948 were achieved by these foremen—sitting: R. S. Dean (left), Lewis Simpkins, Clyde Hammond, Byron Ball, Lewis Hardesty, Jones Kennedy, Norman Pressley and Harry West; standing: Mike Ferrell (left), Raymond Woodward, C. W. Bellew, G. A. Neal, Roy Short, Hubert Thomas and Charlie Turk.

THOSE FOREMEN who cleared their records through the merit system after having one or more lost-time accidents in 1948 included: Herbert Williamson (left), Millard Plymal, D. W. Halstead, Floyd McCoy, W. B. Hodges, and Sherman Tessner; standing: Don Hatfield (left), Glenn Sneed, Harry Davis, J. H. Turner, C. F. Edwards, Ted Morgan and William DeHart.

Honored by Red Jacket Coal Corp. at Annual Safety Dinner

SPEAKERS' TABLE at annual Red Jacket Safety Dinner (COAL AGE, February, p. 166) held to honor the 40 percent of the company's foremen whose crews have worked from one to three years without a lost-time accident included: H. E. Sanford (left), supervising inspector, U. S. Bureau of Mines; Mack Davis, coal inspector, U. S. Bureau; J. J. Ardigo, secretary, Coal Operators' Association of Williamson Field; C. H. Williams, assistant chief engineer, Red Jacket Coal Corp.; W. H. Tomlinson, supervising engineer, U. S. Bureau; R. A. Ison, assistant general manager, Red Jacket; M. J. Ankeny, chief, Coal Mines Inspection Division, U. S. Bureau; P. M. Farquharson, chief safety inspector, Red Jacket; J. J. Plasky, training and safety director, Red Jacket; A. J. Alexander, chief, W. Va. Department of Mines; Paul D. Ritter, President, Red Jacket; J. J. Forbes, chief, Health and Safety Division, U. S. Bureau; W. M. Ritter, general manager, Red Jacket; A. U. Miller, supervising engineer, U. S. Bureau; J. P. Hatfield, mayor, Williamson, W. Va.; and Lex Trunko, coal inspector, U. S. Bureau.



FOREMEN WITHOUT LOST-TIME ACCIDENTS IN 1946-47-48—sitting: T. D. Jordan (left) and J. Carl Cook; standing: Haywood Dean (left) and Grover Bradford. The fifth, E. M. Tolliver, was not present. Collectively, these five foremen in the past three years have supervised the mining of 870,000 tons of coal without a lost-time accident among their crew members.

TROPHY FOR THE BEST 1948 SAFETY RECORD among the company's eight operations is accepted by A. F. Cook (right), superintendent, Junior mine, from Paul D. Ritter, Red Jacket president. In 1948, man-hours at this mine totaled 949,669 and in mining 616,978 tons the frequency rate was 34.75 and the severity rate 1.21. It has produced 1,023,357 tons since the last fatality.

Lehigh Navigation Cited For Top Safety Record

The Pennsylvania Department of Mines last month commended as a "most remarkable record" the 1948 safety record of the Lehigh Navigation Coal Co., Lansford, Pa. The company took first place in a list of 39 major anthracite producing companies, with a fatality rate of 0.46 per million man-hours. The department's commendation was contained in a letter to D. Clinton Helms, general manager of the company, written by Joseph J. Walsh, Deputy Secretary of Mines.

"Confronted as you are with so many critical and complex mining problems not generally found elsewhere," Mr. Walsh wrote, "you and your organization have a perfect right to be proud of the fatality rate established at your operations in 1948. Our revised fatality statement, based upon actual figures, places your company at the top of the list of the 39 companies that had fatalities, with a rate of 0.46 per million man-hours.

"This accomplishment must be regarded as most remarkable when one considers the unusual physical conditions encountered in your mines."

The annual report of the company's safety department revealed that both the severity and the frequency rates of accidents were reduced last year. There were fewer lost-time accidents and two less fatalities than the previ-

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Now is the time to *FIGHT SOCIALISM* in Washington

Do we want to follow Britain down the economic skids?

We Americans face that question today. For we are being advised by Administration economists in Washington to take the course which destroyed Britain industrially. It is the temporarily easy course of cutting down expenditures for tools in order to have more things to consume right away.

The President's Council of Economic Advisers tells us we are spending too large a part of our national income on new tools and equipment. A larger share, they say, should go for goods and services used directly by consumers.

Before we take that advice, let us look at Britain. When the British once allowed their industrial plants and equipment to run down – they started down a dreary road to industrial stagnation and decay.

British industry once ruled the world. Low production costs enabled it to undersell all competitors. Efficiency gave British workers the highest living standards anywhere.

Now all that Britain has between it and economic disaster is pluck and American aid through the Marshall Plan.

The British people are living poorly – still on rations and in austerity. With practically everyone working, and working longer hours than we do in the United States, they cannot produce enough to pay for the raw materials and food they must import.

How did Britain get in this fix?

The story is complicated. British sacrifices in two wars play a tragic part in it. But another fact also stands out:

Britain began to go downhill even before World War I – when British industries allowed their plants and equipment to grow obsolete.

Once that process started, it grew steadily worse. By 1929 the share of Britain's national income being plowed back into capital investment had shrunk to less than two-thirds of what it had been twenty years earlier. We were putting twice as big a share of our national income into capital goods at this same time.

Skimping on capital equipment – on new plants and new tools – put the skids under industrial Britain.

World War II only speeded up a process already well under way.

continued on next page

British industry today shows the results of its failure to keep up to date. Here are three examples found by Dr. Laci Rostas, Britain's leading authority on measuring workers' productivity:

An American produces *four* times as much pig iron as his British counterpart.

He produces *more than four times* as many tires.

In all industry, on the average, an American produces almost three times as much.

The real reason is the American's better tools. The British are struggling with equipment that is, on the average, forty years old.

Britain once had a big head start in industrial equipment. But she let it slip away. And as it went, Britain's industrial and political leadership slipped with it.

How could British leaders have slept while all this happened?

This, too, is a complicated story. But parts of it stand out clearly:

1. *British business men put in more time perfecting cartels to avoid competition than they did in improving their plants and equipment to meet it.*

2. *British labor leaders concentrated on sharing the work and sharing the wealth—rather than doing the job necessary to have enough wealth to make the sharing worthwhile.*

3. *British governments taxed away the means to buy new equipment. By steadily increasing personal taxes, they undercut the* ability *of individuals to invest in new equipment. Finally, they took away the* incentive *to get new equipment by progressively taxing away any returns on it.*

4. *Farseeing socialists smiled all the while, knowing that as private industry more and more lacked the tools to do a progressive job, they would have their chance to run the country.*

Now, with Britain's fate in their hands, the socialists are trying desperately to stem the nation's economic decline by rebuilding its industrial plants and equipment.

They are making a little headway, but not enough. There are several reasons. One is that Britain must export most of the new equipment she can make. *Another major reason—increasingly important for her future—is that money needed to renovate Britain's run-down industry is taxed away to support welfare programs.* The (London) *Economist* grimly puts it this way:

"The importance of the function of saving has only been discovered now that the means of saving have largely been destroyed."

Our own Federal and State governments, too, have dangerously whittled away incentives. They have more than tripled tax rates on personal and corporation incomes in the last twenty years. Now, the President proposes to do more whittling.

If the United States is not to go Britain's way, we must preserve our incentives to save and to invest in industry.

If the United States is to progress, we must continue to build up our industries.

The President's Economic Advisers say we can slow down. But the McGraw-Hill survey of "Business' Needs for New Plants and Equipment," reported in the previous editorial in this series, produced facts to the contrary. It showed that industry *now* plans—*if it can get the money*—to spend $55 billion in the next five years for new plants and new tools. Moreover, it showed *industry's needs* for new facilities are large.

By cutting down the incentives to save, by giving soothing advice that we do not need to save so much, Washington is pushing us toward Britain's way—the route via industrial stagnation to socialization.

Before we skid too far, we should pull up short and ask ourselves: Do we want to go Britain's socialistic way?

There still is time to say, "No."

A complete report on our national survey, "Business' Needs for New Plants and Equipment," may be obtained by writing McGraw-Hill Publishing Co., 330 West 42nd St., New York 18, N. Y. This is the fifth editorial of a special series on industry's needs for new plants and equipment.

James H. McGraw Jr.

President, McGraw-Hill Publishing Company, Inc.

MEETINGS

- Appalachian Coals, Inc.: 27th fuel engineering conference, in cooperation with Detroit section, A.S.M.E., March 9, Horace H. Rackham Educational Memorial Bldg., Detroit.
- Canadian Institute of Mining and Metallurgy: annual meeting, April 25-27, Windsor Hotel, Montreal, Que., Canada.
- Seventh Annual Anthracite Conference: May 5-6, Lehigh University, Bethlehem, Pa.
- American Mining Congress: coal convention and exposition, May 9-12, Cleveland, Ohio.
- American Retail Coal Association: annual meeting, June 7-8, Hotel Cleveland, Cleveland, Ohio.
- American Coal Sales Association: annual convention, June 9-11, The Greenbrier, White Sulphur Springs, W. Va.

ous year. The report cited as contributing factors the "safety school" conducted for workers in the Lansford, Coaldale and Tamaque operating districts last year in cooperation with the U. S. Bureau of Mines, and the annual first aid contest held at Lansford High School stadium in August.

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Personal Notes

W. B. Moore, formerly mining engineer, No. 7 colliery, Susquehanna Collieries Division, M. A. Hanna Co., Nanticoke, Pa., has been named assistant superintendent, No. 6 colliery, Glen Lyon. **M. F. Farrell Jr.,** assistant mining engineer at No. 7 colliery, has been promoted to mining engineer, succeeding Mr. Moore.

David Edwards has been transferred from mine foreman at the Truesdale colliery of the Glen Alden Coal Co., Scranton, Pa., to a similar position at the Baltimore shaft of the Inman colliery, to succeed the late **Harry Hughes. Leo Davis** has been promoted from section foreman to mine foreman at Truesdale colliery, replacing Mr. Edwards.

Charles Haberlen, chief engineer, Bell & Zoller Coal & Mining Co., Zeigler, Ill., has resigned to become superintendent, Enoco Collieries, Bruceville, Ind.

Arne A. Mattila, for the past three years mining engineer, Republic Coal Co., Roundup, Mont., has been appointed mining engineer, mining branch, conservation division, U. S. Geological Survey, and will assist in the supervision of mining operations on leased government land in the Billings, Mont., district. A graduate

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In three mines, the Pikeville Coal Company uses 15 International Power Units to drive pumps, fans, generators and car hoists. One of these, an International U-4 Carbureted Power Unit, drives a 30-inch suction fan drawing 5,000 cubic feet of air per minute from a heading of 3500 feet.

LEE MARSH, superintendent, says: "We use nothing but International Power Units. The fifteen Internationals we are using will stand more hard work than any engine built. Service from International Dealers is good and parts are easy to obtain."

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POWER UNITS

of the Montana School of Mines and a veteran of the last war, Mr. Mattila previously had been associated with the Anaconda Copper Mining Co. for seven years.

George Bagwill, Harrisburg, Ill., an Illinois state mine inspector under five governors, has retired after almost 20 years of service in that position. Upon his retirement, Mr. Bagwill received from former Gov. Dwight H. Green a certificate of meritorious service in recognition of his work. Mr. Bagwill has been connected with the mining industry for 64 years, having started in the mines at the age of 14. In between terms as a state inspector, he was a mine superintendent for the O'Gara Coal Co., predecessor of the Sahara Coal Co., and also at another operation at Norris City.

J. M. Cummings, for the past 12 years a specialist in industrial minerals for the British Columbia Department of Mines, has resigned to engage in private consulting work in the fields of industrial mineral and coal development, processing and geology. For the first six years with the department, he was active in the geology and development of nonmetallic resources of the province. From 1942 to 1945 he was on loan to the British Columbia War Metals Research Board and for the following 1½ years was on loan to the British Columbia Research Council. Since the fall of 1946 he has served the department as resident engineer at Vancouver.

William Johnson, DuQuoin, Ill., has been appointed assistant director, Illinois Department of Mines and Minerals, succeeding **Robert Weir**, resigned. Mr. Johnson served as a state mine inspector from 1934 to 1941 and for the following five years was with the U. S. Bureau of Mines as an explosives engineer. Prior to his appointment, he was associated with the Bell & Zoller Coal & Mining Co. Mr. Weir has been appointed assistant night superintendent, Nokomis Coal Corp., Nokomis, Ill.

Frederick T. Richards has been promoted from assistant director to director of purchases for the Westmoreland Coal Co. and the Stonega Coal & Coke Co., Philadelphia, succeeding **Clyde B. Crusan**, who has retired.

Carl A. Marshall has been named director of the Fairmont Coal Bureau, with offices in New York City. Mr. Marshall relieves Earl C. Payne, who has served as acting director since the resignation of Julian E. Tobey early last fall. Mr. Marshall has been associated with the bituminous industry since 1929 when he joined the North American Coal Corp. The following year he joined the staff of the Consolidation Coal Co. in its eastern district offices. He was called to military duty in 1942 and at one time

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served as chief of the petroleum and fuel branch of the ETO.

John A. Debarge, Bicknell, Ind., and **James E. Sebree**, Terre Haute, have been appointed Indiana state mine inspectors.

George E. Owen has been elected vice president, and **Harry B. Bartley**, assistant to the president, Imperial Coal Corp., New York, according to an announcement by Charles A. Owen, president of the company.

Several appointments of operating personnel at the Timothy mine, Greenbrier County, West Virginia, have been announced by W. E. Sellards, president, Left Fork Fuel Co., Inc., Rupert, W. Va. **David Bryce** has been named general superintendent; **M. C. Hawkins**, chief engineer; and **Joe Grabowski**, night foreman. **H. B. Chapman, S. E. Kessler, Leo Dorman** and **William Grabowski** have been appointed section foremen.

B. Arnold Workman has resumed his position as general superintendent, The Lorado Coal Mining Co., Lorado, W. Va., following a six months' leave of absence in Blacksburg, Va. He is expected to concentrate his efforts on the operation of No. 5 mine, under the direction of L. F. Workman, general manager of mines. Mr. Workman first worked for the company part-time while in high school and on graduation in 1937 went on full-time as a track helper. He held various supervisory positions and was named general superintendent in July, 1946.

George M. Neal has been appointed assistant to the manager of industrial relations, T. C., I. & R.R. Co., Birmingham, Ala. Mr. Neal joined the company in 1938 and was division operations engineer at Wenonah when he was transferred to the industrial relations department.

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Obituaries

James W. Starks, 67, newly appointed director of the Illinois Department of Mines and Minerals (*Coal Age*, February, p. 127), died Feb. 3 at the State Hospital, Springfield, Ill., following a heart attack suffered while talking in the hall outside his office in the Capitol building. Previous to taking the state office, Mr. Starks had been associated with the Peabody Coal Co. for 27 years, the last 10 as superintendent of the company's Taylorville - Springfield division. He was a past president of the Illinois Mining Institute and also served as a state mine inspector at one time. Mr. Starks, who was highly regarded in mining circles throughout the state, began his mining career as a mule driver as a boy. Just four days previous to his death, he

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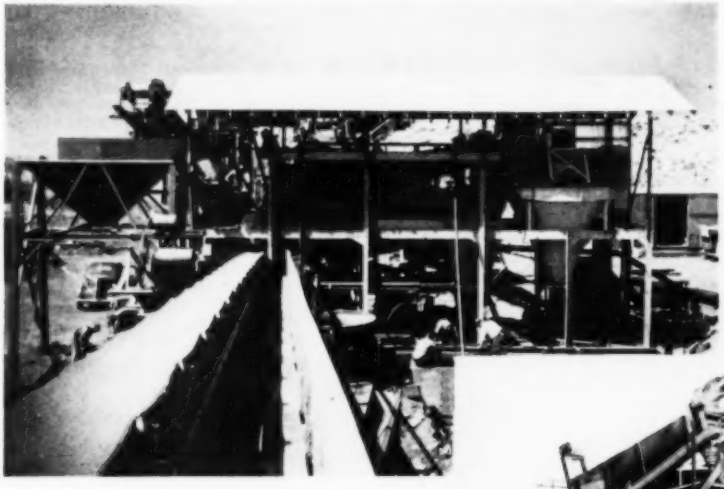

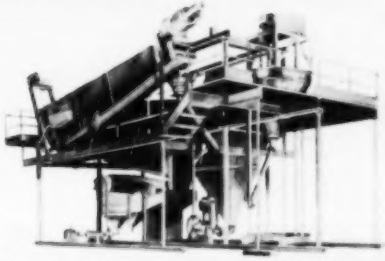

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had attended the funeral of his brother, Noah Starks, West Frankfort, Ill., for many years a mechanical supervisor for the Chicago, Wilmington & Franklin Coal Co.

James Corcoran, mine foreman, No. 1 shaft of the No. 9 Coal Co., Pittston, Pa., died Jan. 28 from a heart attack suffered shortly after he had come up from an underground tour of the mine and had seated himself in the engine house on the surface.

E. C. Mattox, 68, for nearly 25 years president of the Roundup Coal Mining Co., Roundup, Mont., until his retirement a year ago, died Jan. 6 at his home in Bozeman.

Harry F. Bovard, 78, president since 1922 of the Keystone Coal & Coke Co., died Feb. 2 at his home in Greensburg, Pa. In recent years, the company's properties have been operated under lease by other organizations. Mr. Bovard was the father of James M. Bovard, president of Carnegie Institute of Technology.

Peyton Guthrie, president and general manager, Big Jim Coal Co., Blanche, Ky., died suddenly Feb. 12.

New Developments

•Completion of a nine-mile spur by the B. & O. R. R. to serve a new mine of the Clinchfield Coal Co., near Overfield, W. Va., was recently announced. The new spur, which was started in September, 1947, and cost $3,365,000, joins the Berryburg branch of the B. & O. at Berryburg, W. Va. An unusual feature of the project was the construction of the 1,525-ft.-long Lough Tunnel, built through abandoned mine workings. The new Clinchfield mine, previously reported, will have an estimated production of 1,000,000 tons annually, with a life expectancy of 25 years.

•Lease of the 7,000-acre S. M. Kaemmerling coal properties near Meriden, W. Va., has been announced by White & Frederick, Clarksburg, W. Va. Both coal and coke will be produced and the company is rehabilitating 50 beehive coke ovens at Meriden closed since 1928. Additional siding and rail-loading facilities are being planned. Coal is to be produced by deep-mining and, also, stripping where possible. The Malone Bros., Phillippi, W. Va., will continue to produce coal as lessees of White & Frederick. Officials of White & Frederick, Inc., are E. M. Frederick, C. W. White and A. J. Frederick.

•Morgan Mines, Inc., Indianapolis, Ind., opened in January its new stripping operation in Williamson County, near Herrin, Ill. A new modern McNally-Pittsburg tipple and washing plant has been completed and capacity of the operation is 2,500 tons of washed coal daily. Shipments are be-

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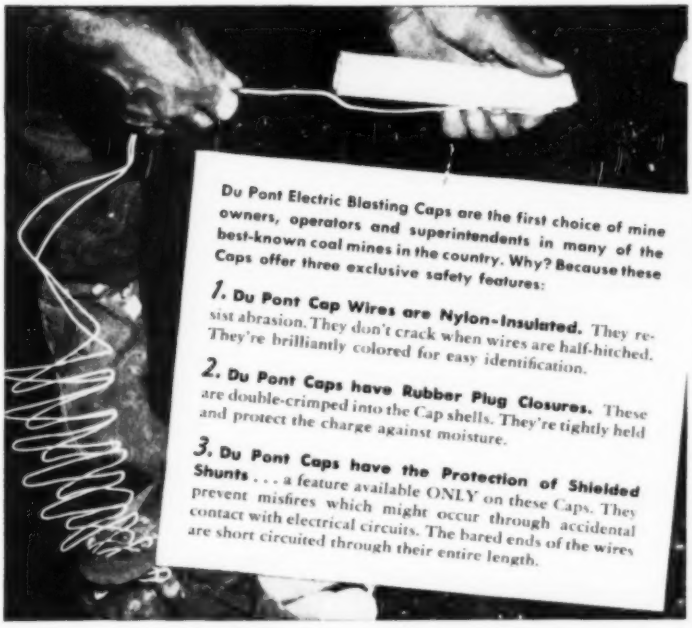
AMERICA'S Nº1 CAPS



Du Pont Electric Blasting Caps are the first choice of mine owners, operators and superintendents in many of the best-known coal mines in the country. Why? Because these Caps offer three exclusive safety features:

1. Du Pont Cap Wires are Nylon-Insulated. They resist abrasion. They don't crack when wires are half-hitched. They're brilliantly colored for easy identification.

2. Du Pont Caps have Rubber Plug Closures. These are double-crimped into the Cap shells. They're tightly held and protect the charge against moisture.

3. Du Pont Caps have the Protection of Shielded Shunts . . . a feature available ONLY on these Caps. They prevent misfires which might occur through accidental contact with electrical circuits. The bared ends of the wires are short circuited through their entire length.

Du Pont Electric Blasting Caps are supplied in standard wire lengths of 4, 6, 7, 8, 9, 10 and 12 feet. White insulation identifies iron wire caps for single-hole shooting, while copper wire caps for multiple-hole shooting have one red and one yellow wire.

The Du Pont Explosives representative serving your district will gladly give you complete information about these preferred Caps and other popular Du Pont products for economical, efficient coal mining.

E. I. DU PONT DE NEMOURS & CO. (INC.)
EXPLOSIVES DEPARTMENT
WILMINGTON 98, DELAWARE

DU PONT EXPLOSIVES

BLASTING SUPPLIES AND ACCESSORIES

Mine Superintendents Owners . . . Shot Firers

O. K. THESE PERMISSIBLES

"Monobel" AA . . .

best-seller in the field of permissibles. Economical and a big lump coal producer of exceptional ability. Splendid water-resistant qualities.

"Lump Coal" C . . .

an old favorite. Has a slow, heaving action that speeds production by pushing the coal away from the face where mechanical loaders can easily get at it. An economical coal producer.

"Gelobel" C . . .

popular, high-velocity permissible. Widely used in hard rock and slate work. A gelatinous dynamite, highly water-resistant and ideal when wet going is encountered.

For Stripping . . .

You can introduce maximum safety in stripping operations with Du Pont "Nitramon"* blasting agent. "Nitramon" cannot be detonated with commercial blasting caps, or by fire, friction, falling objects or even the impact of rifle bullets . . . yet, it is readily detonated with "Nitramon" Primer, itself relatively insensitive.

Easy to handle . . . non-headache producing; and because it is packed in watertight metal cans, "Nitramon" can be safely loaded far in advance of firing time. If you are on a stripping operation . . . be sure to get complete information about "Nitramon" . . . the safest blasting agent.

Additional Popular Blasting Supplies

DU PONT RHEOSTATS — LEADING WIRE
BLASTING GALVANOMETERS
TAMPING BAGS — CONNECTING WIRE

Listen to "Cavalcade of America"— Monday evenings—NBC

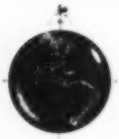
*Reg. Trade Mark for nitrocarbonitrate blasting agent.

DU PONT

BETTER THINGS FOR BETTER LIVING
. . . THROUGH CHEMISTRY

NORTH • EAST • SOUTH • WEST • IT'S SCHRAMM!

CHOOSE *as others have* THE MODEL THAT BEST FITS YOUR NEEDS!



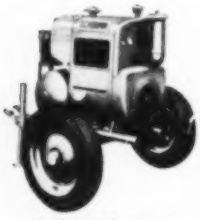
There's a Schramm Air Compressor, size and model, to meet your specific needs!

Below are listed some of the many Schramm models, portables ranging from 20 to 420 cu. ft. of actual air, the stationary ranging from 2 to 600 cu. ft. displacement.

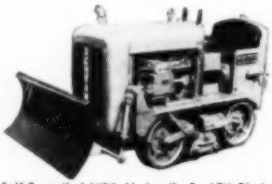
On all models performance records are evidence of their high quality. You will find the name Schramm written on every important page in compressor history.

Features you get in Schramm are: 100% water cooled, assuring ideal performance summer and winter; mechanical intake valve, forced feed lubrication, and electric-starter starting. All Schramms are compact, lightweight, easy to operate.

We invite you to write today for fully illustrated catalog describing in detail each of the Schramm Air Compressors shown here . . . plus a wide range of other models. We feel the Schramm story is a good one, and offers you a sure way to get your many compressed air jobs done quickly, efficiently, and economically.



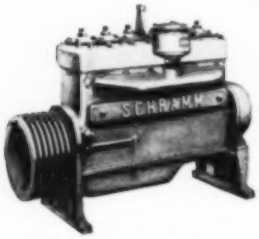
20-35 Model Compressor



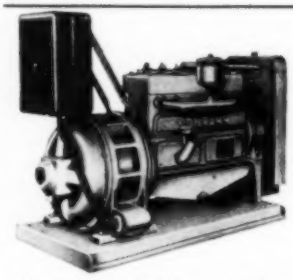
Self-Propelled With Hydraulic Backfill Blade

Skidded for Truck Mounting

Diesel Engine Drive



"V" Belt or Flat Pulley Drive



Built-in Motor Drive with Cooling Unit and Starter

SCHRAMM INC.

THE COMPRESSOR PEOPLE • WEST CHESTER • PENNSYLVANIA

ing made over the Chicago, Burlington & Quincy and Illinois Central railroads and sales are being handled by the Reliable Coal & Mining Co., Chicago.

Stripping on the property is handled by a new Marion 7400 walking dragline equipped with a 12-yd. bucket and 175-ft. boom. Coal is loaded by shovel into 25-ton Euclid trucks for haulage to the 125-ton bin at the tipple. The washing plant, built for one-man pushbutton control, is so arranged that all or any part of the coal can be crushed and processed to domestic-stoker coal, which features the Viking vaporized hot-oil treatment.

•Coal Processing Corp., Big Laurel, Va., reportedly is developing a new mine in the Horne Hollow section on land leased from the Clinchfield Coal Corp. The company also is understood to be installing new machinery and planning expansion of operations at its Dixianna mine.

•The Bortz Coal Co., Uniontown, Pa., is reported to have purchased for $175,000 some 300 acres of coal lands in Spring Hill Township, Pennsylvania, and Monongalia County, West Virginia.

•The old Victor-American mine at Chandler, Colo., is being reopened by the Silengo Coal Co., Canon City, Colo. J. B. and Charles Silengo, father and son, reportedly have acquired 1,200 acres of coal land and will mine some virgin coal in addition to opening up part of the workings of the Chandler mine, closed for several years. A slope now is under construction and a production of 100 tons daily is expected.

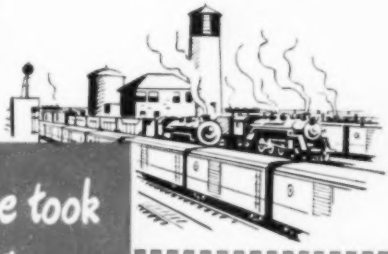
•Stripping operations at the Colorado Fuel & Iron Co. recently were transferred from its Pictou mine to its Ravenwood property five miles away, following exhaustion of the Pictou strip area. The Bucyrus-Monighan walking dragline proceeded to the new site under its own power. About 60,000 tons of coal is available and its mining is expected to require 12 to 18 months. Cooley Bros. and Park Coal Co. are the stripping contractors and sales are handled by C. F. & I. The Park Coal Co.'s tipple will be used at the new site, loading onto a railroad spur connected to the main line by a newly installed switch.

•The McGowan Coal Co., National, Carbon County, Utah, has been purchased by the Hudson Coal Co., Salt Lake City, according to W. H. Sweet, secretary-treasurer of the Hudson company. The property, which lies between Hudson's mine and that of the National Coal Co. purchased by Hudson a year ago, consists of 200 acres of patented land, 200 acres of leased land, the mine and a town site. Hudson is planning intergrated operation of the three mines.

•The Glomawr mine and tipple of the

NEW **COAL & ORE FACILITIES**
$14,500,184.

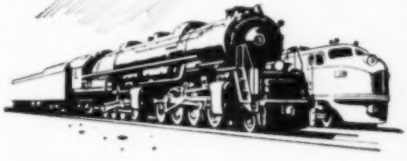
IMPROVEMENTS
THROUGHOUT LINES
$35,923,192.



Steps we took for our New Look

NEW
FREIGHT CARS, ETC.
$73,991,471.

NEW
LOCOMOTIVES
$27,464,658.



To give you finer Freight Service the Baltimore & Ohio has spent, in the last three years, $173,618,959. Constantly *doing things* better—the B & O way—means vast expenditures. All this adds up to better facilities, faster trains, and dependable service. We pay what it takes to *have* what it takes.

Those three years of "doing things better" saw 212 new locomotives on our rails, together with 19,139 new freight cars. They saw new classification yards and extensive terminals; heavier rail to carry our trains, better signals to speed them, modern communications to report their positions and furnish on-the-spot location of cars for customers; efficient, latest-type coal and ore facilities.

Never have we been better able to meet the needs of our customers. And this constant improving shall continue. As it does, you will have more and more reasons for *depending* on B & O service. *Ask our man.*

LINKING 13 GREAT STATES WITH THE NATION
B&O

Baltimore & Ohio Railroad

Constantly *doing things* **— better!**

TIPPLE EQUIPMENT

SHEAVES

CAGES

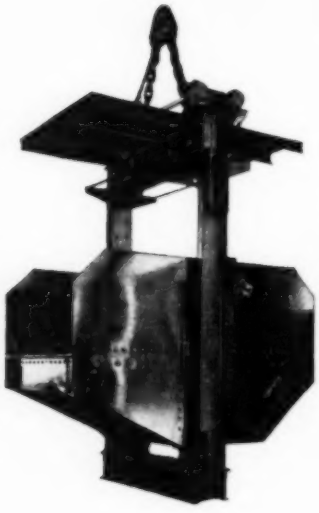
SKIPS

LOWERING SPIRALS

CAR PULLER AND RETARDERS

LABORATORY CRUSHERS

For
Fast
Caging
Fast
Hoisting
Fast
Dumping
Choose a
HOLMES CAGE



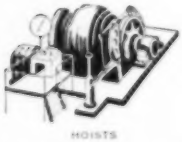
Pre-tested suspension chains with fittings of ample proportions for added protection—Modern improved safety devices reduce danger of serious accidents—Simplified standard Caging and Dumping mechanisms, the results of careful designing—Rugged, well balanced construction, reserve strength built in at critical points, keeping weight at a minimum—Latest design and manufacturing standards plus highest quality material obtainable are used exclusively.

We offer a complete line of Stationary Platform—End Dumping—Side Dumping—Overturning—Man and Material Cages, manufactured from steel or aluminum.

Why not decide on Holmes Cages and benefit from our 50 years experience and leadership in building cages of all types. We'd like to receive your inquiry—our study and recommendations will be made without obligation on your part.

ENGINEERS, MACHINISTS
STEEL FABRICATORS
PATTERN MAKERS
GREY IRON FOUNDERS

DANVILLE ROBT. HOLMES BROS. ILLINOIS


HOISTS

VIBRATING SCREENS

DUSTOLATORS

ROBERT HOLMES & BROS., INC.
DANVILLE, ILLINOIS

Hatfield-Campbell Creek Coal Co., Glomawr, Ky., has been purchased by the Eblen Coal Co., Hazard, Ky. Coal from both the Glomawr mine and the Eblen mine is to be handled at the Glomawr tipple.

•Hiram Swank's Sons, Johnstown, Pa., reportedly was expecting to open about April 1 its new No. 23 slope mine at Maple Ridge, Somerset County, Pa. The operation will have a capacity of 500 tons daily and mine the "B" seam. Shipments will be made via the B. & O.

•Hawthorne Coal & Coke Co., Norton, Va., is reportedly planning to reopen its Hawthorne mine near Norton. The Blair seam will be mined and development to a capacity of 1,000 tons daily is being planned.

•

Pennsylvania House Gets Mine Regulatory Bills

Proposals to increase the stripping bond from $200 to $500 an acre and to permit third-class cities to regulate mining carried on under privately owned property within their boundaries were introduced recently into the Pennsylvania House of Representatives.

The stripping bill sponsored by Rep. Robert D. Fleming amends the 1947 law requiring the backfilling of strip pits and the leveling and restoration of lands affected by anthracite operations. It was accompanied by a companion bill calling for the same increased bond for bituminous operators. The minimum bond of $2,000 now required is not changed.

Later, Rep. Robert R. Clapper introduced a bill that upped the minimum bond from $2,000 to $5,000, although it called for a similar increase in the bond per acre, to $500.

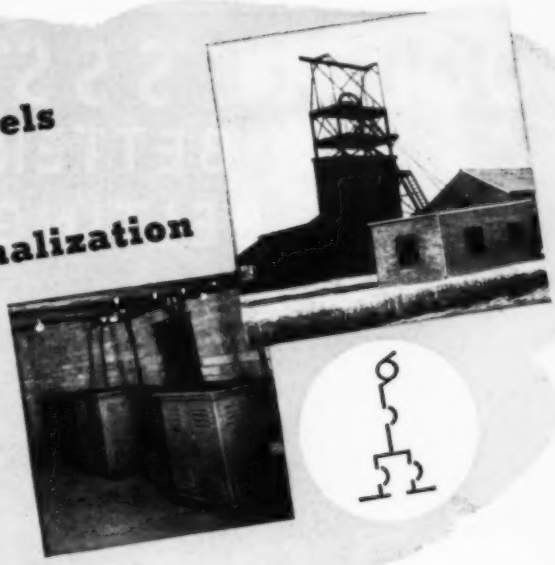
The deep-mine proposal sponsored by Reps. George D. Stuart, James E. Lovett, and Anthony J. Petrosky would amend the present law that permits third-class cities in the anthracite region to regulate coal mining under city streets, alleys and highways. It also would extend the authority for such control to cities in the bituminous coal regions in the state.

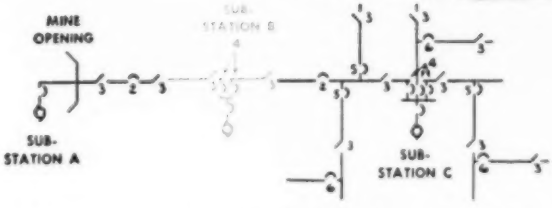
•

Wrong Listing

In the preparation of the reports for "What Coal Men See Ahead" for the February issue of *Coal Age*, Paul L. Shields was listed as vice president of the United States Fuel Co., Salt Lake City, Utah. Actually, Mr. Shields is president of the Spring Canyon Coal Co., also with headquarters at Salt Lake, and in publishing this correction the editors express their sincere regret for the error and offer their apologies to all concerned.

How to boost production levels through proper sectionalization





APPLY THIS I-T-E SECTIONALIZING PLAN:

KEY

2 I-T-E Type KSC Circuit Breaker — installed in circuit between each two substations.

3 A disconnect switch or protective device placed at not over 1500 foot intervals in every power line.

4 I-T-E Type KSC Circuit Breaker (replace operating mechanism) — used as overcurrent protective device in each circuit leaving a substation.

5 I-T-E Type KSC Circuit Breaker — installed as overcurrent protective device at each main branch circuit.

6 I-T-E Type KSC Circuit Breaker — to protect secondary branch circuits (i.e. a circuit feeding only one local section or territory).

Note: In every case, sufficient feeder and return circuit capacity should be provided so that circuit breaker will be opened by a dead short at the most remote point of the circuit.

●When electrical distribution systems are sectionalized with I-T-E Sectionalizing Switchgear, production levels are raised: time lost because of electrical disturbance is kept to a minimum, and safety to personnel and equipment is assured.

In the above application, the heart of protection is the I-T-E Type KSC Automatic Reclosing Circuit Breaker. The only circuit breaker designed especially for the mining industry, the KSC has ample flexibility for meeting changing mine conditions. Completely dependable, it is durable and efficient under the most severe operating demands. Rugged and compact for easy portability, it is also completely metal-enclosed for safety — yet readily accessible for inspections and maintenance.

The I-T-E representative in your locality can give you complete information on the I-T-E Type KSC Automatic Reclosing Circuit Breaker. He is also fully qualified to assist you in the adoption of recommended sectionalizing practices in your mine. Use his services with no obligation.

Be Production-Wise Sectionalize!

SECTIONALIZING

SWITCHGEAR

The Leader In Technical Excellence

I-T-E CIRCUIT BREAKER COMPANY, 19th & HAMILTON STREETS, PHILADELPHIA 30, PA.
31 OFFICES IN UNITED STATES • In Canada, EASTERN POWER DEVICES, Ltd., TORONTO

SWITCHGEAR • UNIT SUBSTATIONS • AUTOMATIC RECLOSING CIRCUIT BREAKERS

GOODALL "SSS" *Traditionally* BETTER BELTING

"SSS" stands for Super-Severe Service . . . belting that's built to *last longer* under conditions that test true belting quality. Provides exceptional resistance to friction wear against rollers and pulleys. Has the strength to carry heaviest loads with minimum stretch and sag. Is highly resistant to shock and abrasion occuring at loading point. Withstands constant flexing over pulleys without affecting friction between plies. Specification details determined by individual job requirements. *Contact our nearest branch for further details and prices.*

THE GOODALL TRADITION

Quality is the goal of every step in the making of a Goodall belt. Extreme care governs every procedure, from selection of materials to final "curing." The entire process is handled by men whose expert craftsmanship and traditional pride in their product permit no tolerance of "second-best."

GOODALL RUBBER COMPANY

GENERAL OFFICES, MILLS and EXPORT DIVISION, TRENTON, N. J.

Branches: Philadelphia • New York • Boston • Pittsburgh • Chicago • St. Paul • Los Angeles
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Est. 1870

New Inspection Bureau Proposed in Senate Bill

A new Bureau of Coal Mines Inspection in the Department of the Interior, divorced from and of equal standing with the Bureau of Mines, is called for in a bill (S. 679) introduced into the Senate by Sen. Johnson (D., Col.). The new bureau would be headed by a director with a salary of $10,000 annually and all equipment used and work carried on by the Bureau of Mines under the 1941 Mines Inspection Act would be transferred to it.

The bill has been referred to the Committee on Interior and Insular Affairs, which reportedly plans no legislative action on it at the present time.

Pennsylvania Bill Seeks Underground Safety Rooms

Construction of special underground safety chambers for protection in mine disasters would be required of bituminous mine operators in Pennsylvania by a bill introduced into the legislature last month. The rooms would be built of fireproof material, with boreholes to the surface for air, and equipped with first aid equipment and gas masks. The boreholes would be used for telephone lines, emergency aid and food transportation.

The bill, which is similar to one unsuccessfully introduced two years ago, was sponsored by Reps. Lewis E. Evans, James D. Cole, C. O. Williams, J. Dean Polen and Michael Nixon.

Rep. Williams sponsored another proposal that would require bituminous operators to employ an extra motorman as an assistant in the operation of underground mine locomotives.

Reps. Williams and Russell Reese together sponsored a bill requiring employment of assistants to shotfirers in bituminous mines.

Court Upholds Operators In W. Va. Fireboss Case

The West Virginia state supreme court Jan. 26 issued an order temporarily restraining the W. Va. Department of Mines from enforcing its new regulations prohibiting the use of mine foremen and section foremen as firebosses. Some 7,000 to 8,500 miners in various sections of the state, idled by the dispute, reportedly began a return to work shortly afterward.

Some 60 coal operators had protested the departments ruling (*Coal Age*, February, p. 168). In its decision, divided three to two, the supreme court in effect sent the case back to the Kanawha circuit court for further action. The operators had originally sought a restraining injunction in that court, but it had refused to act because of lack of jurisdiction.

On Feb. 3, charges against Frank Brooks, superintendent, Arkwright

ANOTHER SECURITYFLEX *Safety First:*

NON-DETERIORATING GLASS CORD REINFORCING

SECURITYFLEX *Safety Firsts*

- *First* to comply with U.S. Bureau of Mines Flame Test and Pennsylvania Flame Test. (Insist on mark of *full compliance*—P-102-BM—at 12' intervals.)
- *First* neoprene treated Glass Cord Reinforcing—stops wicking of moisture, conducting of stray currents, increases strength.
- *First* and *only* Anti-Short Breaker Strip* construction—cuts short circuits between conductors.
- *First* parallel mine cable with ground wire.
- *First* and *only* D-Shaped* insulation—prevents overriding of conductors.
- *First* to have insulation and outer jacket bonded to form a *solid block* around conductors.
- *First* with smaller diameters that pack more on a reel, ease handling.

*Reg. U. S. Pat. Off.

● Now Securityflex gives you—for the first time in a mine cable—*neoprene treated glass cord reinforcing.* This remarkable cord can't wick moisture and conduct stray currents . . . prevents rot and increases cable strength without sacrificing flexibility.

Consider the advantages of this new feature *plus:* famous Anti-Short Breaker Strip* (available with or without ground wire) . . . flame, abrasion and tear resistant neoprene outer jacket . . . exclusive construction that won't kink or twist . . . special heat resistant synthetic rubber insulation. There's no doubt about Securityflex's superiority.

For more tons per cable, specify Securityflex through Anaconda Wire & Cable Company, 25 Broadway, New York 4, N. Y., or your nearest Anaconda Wire & Cable distributor.

ANACONDA *Securityflex* **MINE CABLE**

ANACONDA

Pre-fill Dummies for Greater Safety at the Bore Hole—

Dummies of Seal-Tite Tamping Bags, pre-filled at one central point, assure the use of permissible stemming materials. A supply of permissible dummies are kept ready for use at the face and can be stored underground under the most humid conditions. *Chemically-treated high wet-strength kraft* and plastic-locked safety seam protect them from breaking and spilling.

Dummies of Seal-Tite Bags are always ready for use. Save time—save labor and eliminate hazards at the face through use of proper stemming procedures.

SEND FOR SAMPLES... specify the sizes you need, or a complete assortment.

Tamping Bag Co.

212 SO. THIRD ST.
MT. VERNON, ILL.

mine, Consolidation Coal Co. (W. Va.), for violation of the new rules were dismissed in a magistrate's court at Morgantown. The charges had been brought against Mr. Brooks by the chairman of the Arkwright mine committee.

Hearings on new West Virginia legislation to strengthen mine safety regulations were held Feb. 14, with considerable criticism of the proposed law aired by operator representatives. Major provisions under fire included requirements that ventilating fans must be kept operating day and night; prohibition of shooting off the solid; and mandatory wearing of electric cap lamps by workers in mines employing more than five men.

R. G. Kelly, counsel for the West Virginia Coal Association, called the measure "unreasonable" and said that its passage would close a number of the smaller mines in the state. The measure was strongly defended by C. E. Jones, safety director, and George J. Titler, president, District 29, U.M.W.A. A regulation requiring a second engineer to be employed on a hoist transporting men in and out of a mine was termed "featherbedding of the first water" by one witness.

Approval of the bill by the house mines committee was reported several days later, but with softening of some provisions for the benefit of the smaller mines. The regulation against shooting off the solid was eliminated and the ventilation clause was amended to require operation of ventilating fans at least three hours before the start of any shift. The committee also recommended a bill that would boost from $500 to $1,500 an acre the deposit required of stripping operators to cover cost of leveling stripped areas after completion of mining.

•

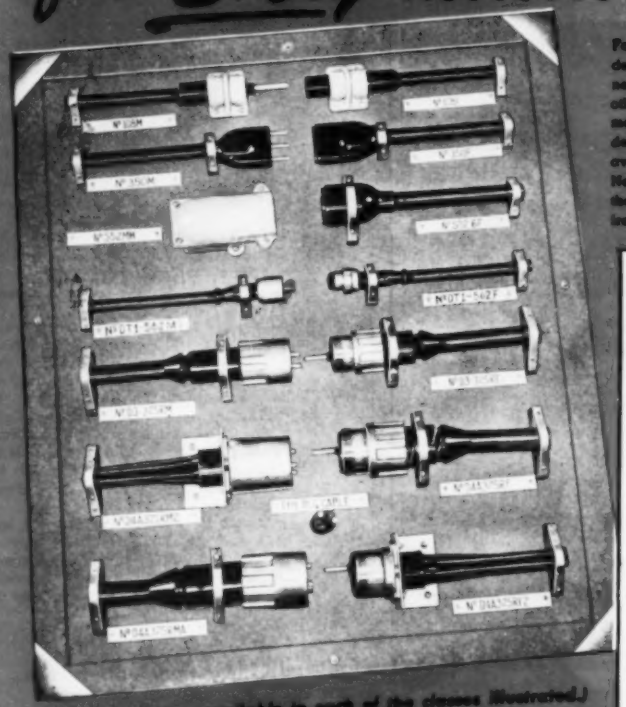
Krug Urges Federal Loans For Synthetic Fuels

Federal loans to industry for the construction of commercial plants producing oil and gasoline from coal and oil shale were strongly recommended Feb. 2 by Secretary of the Interior Krug in his 1948 annual report to Congress on research and development progress of the Bureau of Mines in synthetic-liquid fuels.

Such loans, Secretary Krug said, would accelerate the founding of a great new basic industry offering an assured supply of oil adequate for centuries from known resources within the borders of the United States—self-sufficiency in peace or war.

There is danger, he said, that the United States will depend solely on petroleum until the supply problem has become critical. Then consumers and critics would again shout "too little, too late"—and with ample justification—for then it would require five to ten years to develop any significant productive capacity for synthetic fuels, he pointed out.

Electrical Connectors for Every MINING NEED!



For more than twenty years MINES has been designing and manufacturing Molded Rubber Connectors for America's Mining needs. Today no other line so completely covers all mining requirements. Models illustrated on panel, and briefly described below, are only a few of hundreds available for standard applications. Molded of Neoprene to cable as integral units, (see below) they are ruggedly built to provide long, trouble-free service.

CHECK THESE OUTSTANDING FEATURES

✔ **MOLDED NEOPRENE RUBBER BODY**

All MINES Connectors are molded of oil, wear and flame resistant Neoprene. They won't crack when dropped or shatter when run over

✔ **WATER-TIGHT WHEN CONNECTED**

When inter-connected MINES Plugs and Receptacles seal vital contacts in a resilient Neoprene housing—moisture, oil or dust infiltration is prevented. Thus minimizing replacement costs by insuring longer low-contact resistance.

✔ **CONNECTOR INTEGRALLY MOLDED TO CABLE**

Vulcanized as a unit to cable, MINES Connectors are molded with long tapered necks that make them extra-strong at the vital cable-connector junction.

✔ **SOLID MALE CONTACT PINS**

Accurately machined in one piece, from low resistant rod material, male pins in MINES Connectors have no split ends to collect dust or increase resistance.

✔ **SPRING LOADED FEMALE SOCKETS**

Female sockets in MINES Connectors are spring loaded and ring encased—to automatically compensate for wear and insure a long life of low contact resistance

✔ **BALL BEARING COUPLINGS**

MINES S. P. B. Straight Pin Bigun Connectors, (bottom eight connectors on panel) are equipped with threaded "fire-hydrant" Swivel type, metal couplings for ease in connecting, and to prevent accidental disconnects. Larger sizes revolve on ball bearings. Coupling parts may be renewed separately if damaged.

(Full range of sizes available in each of the classes illustrated.)

Nos. 10SM and 10SF-600 or 3000 volt single conductor class Connectors for cable sizes #10 to 4/0.

Nos. 350M and 350F-220/440 volt, 3 phase ungrounded connectors for cable sizes #14 to #2. Four Conductor, available on standard.

Nos. 552M2M and 552-SF—applicable to D C reversing duty on conveyor control circuits, for cable sizes #8 to #4 with 6 Conductors.

Nos. DT1-302M and DT1-302F-600 volt straight pin "Bigun" swivel coupling class Connectors, for cable sizes #1 to 100MCM.

Nos. D3-375M and D3-375SF-600 volt straight pin (S. P. B. Bigun) swivel coupling class Connectors, for type W cable. Reverse ground contact cable sizes #12 to 250 MCM.

Nos. D4A375SF- same as D3-375M except with continuous pilot control circuit, for use on P.C.G. type cable, illustrated on panel. Are permissible when used with MINES Safety Circuit Couplers. For cable sizes #12 to 4/0.

Nos. D4A375SMA and D4A375SF2 — same as No. D4A375M2 except with short-ed pilot control circuit. Are permissible when used with MINES Safety Circuit Couplers. Cable size #12 to 250 MCM.

Consult a Joy Engineer

Ask for Bulletin RES-805.

SALES AND SERVICE TO THE MINING INDUSTRY BY

JOY MANUFACTURING COMPANY

HENRY W. OLIVER BUILDING • PITTSBURGH 22, PA.

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He didn't forget . . .

He just took a chance!

When workers risk their eyes, with disastrous results to both themselves and the company alike, it's time to look into the cause of unsafe practices.

Goggle Style TAW51

WILLSON answers the problem of getting safety equipment worn by designing the utmost comfort into their entire line of eye and respiratory protective devices. The goggles illustrated have eyecups that are molded to fit the bony structure around the eyes. The chain bridge and elastic headband are adjustable for comfortable fit. And the Super-Tough* lenses meet or exceed Federal Specifications for optical clarity as well as impact resistance.

DAILY REMINDERS

Such as Willson "Blind Man" Safety Posters keep workers aware of the need for wearing goggles. Supplies available on request

WILLSON®

"Established 1870"

*T. M. Reg. U. S. Pat. Office

WILLSON PRODUCTS, INC., 239 WASHINGTON STREET, READING, PENNA.

1949 Coal Show Plans Announced by A.M.C.

Plans for its 1949 Coal Convention and Exposition, to be held at Cleveland's Public Auditorium May 9-12, have been virtually completed, the American Mining Congress reported last month.

Convention meetings being planned by the program committee headed by L. Ebersole Gaines, president, The New River Co., will include discussions of trackless mining, including a symposium on continuous mining; maintenance and ventilation; face preparation; underground haulage; surface preparation; coal utilization and marketing; and management problems. Entertainment will include a welcoming luncheon on Monday, the "Coal Miners' Party" on Tuesday night and the annual banquet Thursday evening. A special entertainment program is being planned for the ladies who may attend.

Over 200 manufacturers will be represented at the exposition of machinery, equipment and supplies and the show will be 40 percent larger than the record-breaking exposition in 1947, according to the Mining Congress. The exposition will be held under the sponsorship of the A.M.C. Manufacturers' Division, headed by J. H. Fulford, vice president, Jeffrey Mfg. Co.

A plan for advance registration has been set up, the Mining Congress states, that will permit those attending to secure their entrance credentials in advance and thus save time on arrival.

•

B.C.R. Mine Committee Settles in Huntington

Leasing of a one-story building at 803 Eighth Ave., Huntington, W. Va., for use of the Mining Development Committee, Bituminous Coal Research, Inc., was announced at the end of January. The committee is carrying on research to develop a continuous cutting-and-loading machine and was expected to take over the new quarters by the middle of February. The work is being financed by a fund of $250,000 contributed by B. C. R. member companies.

Gerald von Stroh, director of the project, will be in charge of the new facilities.

•

Federal Steam Plant Approved by House

Further government inroads into the power field were indicated last month when the House of Representatives rejected a motion to take out of the appropriation bill $2,500,000 allocated for the construction of a steam plant at New Johnsonville, Tenn., in the TVA area. Coal is to be used in the plant.

A TRIP is no better than its weakest wheel

Sterling Cast Steel Wheels are Continuous Trip Insurance

Just as one weak link makes an unsafe chain so a bad wheel makes an unsafe trip. **But when your cars are equipped with balanced design STERLING Cast Steel Wheels, there can be no weak wheels. STERLING Cast Steel Wheels can take the toughest beating on switches, frogs, in transfer stations, etc., continuously without the ordinary service interruptions that cost lost tonnage.**

Consult Sterling Engineers about these power-saving and low maintenance advantages for your operation.

Representatives: J. E. Nieser, 720 Roselawn Ave., Pittsburgh, Pa. R. E. Gerdetz Equipment Co., Box 423, Bluefield, West Virginia. Wetzel Equipment Agency, 375 Southwest Temple St., Salt Lake City, Utah. Wilkes-Barre Equipment Co., Miner's Bank Bldg., Wilkes-Barre, Pa. Schroeder Bros. Mine Equipment and Supplies, 810 Ridge Ave., Pittsburgh, Pa.

Talk about strength—ARMCO Liner Plates really have it. The tough sinewy kind that isn't burdened with excess weight.

One glance at an ARMCO Liner Section will show you why. See those deep corrugations and flanges. They are designed to provide safe strength without excess weight or bulk. This is why ARMCO Liner Plates cost less to carry a given load than any other type.

High strength-to-weight ratio also means that ARMCO Liner Plates are easy to handle and install. One man can carry, hold and bolt a section into place with simple hand wrenches. Jobs go fast—labor costs are low.

You can have complete confidence in ARMCO Tunnel Liner Plates. Use them to construct sloped or vertical entries, air shafts, escapeways, conveyor tunnels, substations and overcasts. Inside diameters range from 45½ inches to 33 feet. Write for complete information now and be ready for that next job. Armco Drainage & Metal Products, Inc., 1375 Curtis Street, Middletown, Ohio. Export: The Armco International Corp.

ARMCO TUNNEL LINER PLATES

ARMCO

Welfare-Fund Trustees Sue Three Coal Firms

Suits by the U.M.W.A. Welfare and Retirement Fund trustees against one coal company in Arkansas and two in Pennsylvania, for recovery of tonnage payments due under bituminous contracts, were reported last month.

The largest of the actions was that brought against Jackson & Squires Coal Co., Mansfield, Ark. The trustees alleged that the company had not paid $2,787.35 due under the 1946-47 contract, $38,500 for 1947-48, and that it had made no payments under the present contract.

In Pennsylvania, the trustees asked for a judgment of $8,384 due under previous contracts and the 20c. levy on coal produced since July 1, 1948, from the Luxner Coal Co., Carmichaels, Pa. Paul E. Garbart, Uniontown, Pa., was sued for more than $5,000 in tonnage payments claimed.

A.I.M.E. Speaker Sees Coal for Western Power

A prediction that coal would be used for West Coast power generation within the foreseeable future was made by Claude P. Heiner, president, Utah Fuel Co., in a paper presented before the Coal Division, A.I.M.E., at the association's annual meeting in San Francisco, Feb. 13-17. The margin between the cost of fuel oil and coal for steam plants is narrowing and eventually will reach the point where use of coal will be economically feasible, Mr. Heiner pointed out.

Other A.I.M.E. speakers called on the government for tax reform to reattract risk capital to the mining industry and for an expansion of government research in the discovery and development of new ore bodies. Artificial incentives were considered objectionable by most of the speakers, although they warned that over-taxing of the industry might force the need for such government concessions.

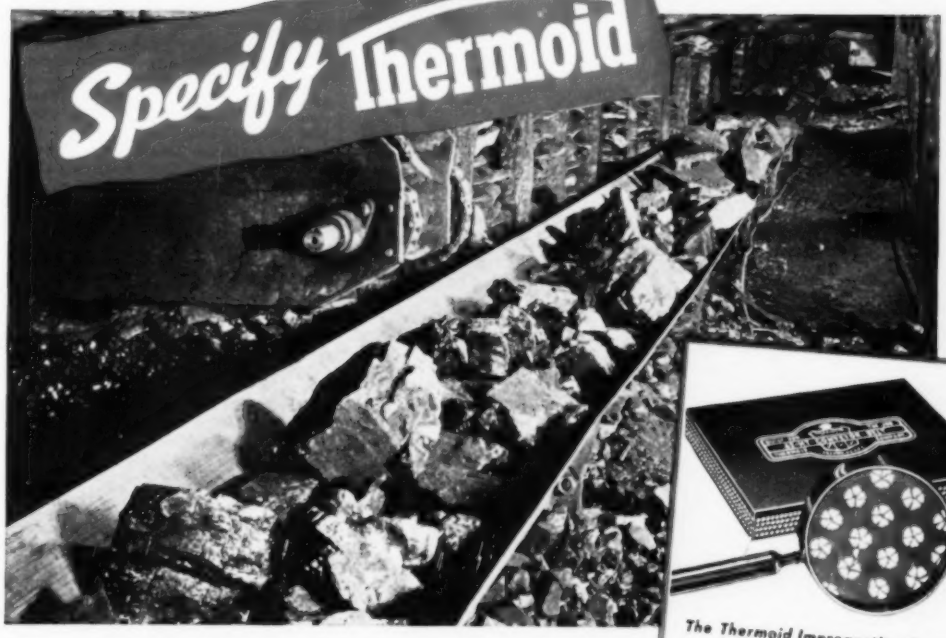
More than 100 members were reported to have attended sessions of the Coal Division. Papers scheduled for presentation included:

Washing Western Coals—"Coal Washing in Utah," Carl S. Westerberg, Utah Fuel Co.; "Coal Washing in Colorado and New Mexico," J. D. Price and W. M. Bertholf, Colorado Fuel & Iron Corp.; "Coal Washing in Washington, Oregon and Alaska," M. R. Geer, and H. F. Yancey, U. S. Bureau of Mines.

Coal Drying and Dewatering—"A Technical Study of Coal Drying," G. A. Vissac, consulting engineer; "Drying of Low-Rank Coals in the Entrained and Fluidized State," V. F. Parry, J. B. Goodman and E. O. Wagner, U. S. Bureau of Mines; "The Rupp-Frantz Vibrating Filter," J. D. Price and W. M. Bertholf, Colorado Fuel & Iron Corp.

Clarification of Washery Water and Classification of Anthracite—"Performance Tests of an Experimen-

Specify Thermoid



Thermoid Impregnation Process Assures Longer Conveyor Belt Life

Thermoid Conveyor Belts are Built for the Job!

For over 68 years, Thermoid has worked with mine operators to develop rubber products to withstand the acidity, moisture and abrasion encountered in mine operations. The result . . . a complete line of Thermoid Conveyor Belts for every major mining application.

Your nearest Thermoid distributor can service your requirements . . . or if you prefer, write us of your problem and we will furnish full details.

It will pay you to *Specify* Thermoid!

Thermoid Quality Products: Transmission Belting • F.H.P. and Multiple V-Belts • Conveyor Belting • Elevator Belting • Wrapped and Molded Hose • Molded Products • Industrial Brake Linings and Friction Materials.

The Thermoid Impregnation Process insures a deeper penetration of rubber between the threads of the yarn, which encases each individual strand with protective rubber. The rubber acts as a sheath between the strands and prevents the destructive abrasion action as the product is flexed in use. To obtain the required rubber penetration, the twist of the yarn must be to exact specifications. With the yarn twisted too tightly, proper penetration of the rubber compound is impossible. This condition produces abrasion, causing premature failure. On the other hand, if the yarn is twisted too loosely, the product lacks tensile strength. Thermoid has discovered the optimum twist of the yarn which assures maximum rubber penetration and greatest strength. The development of Thermoid Impregnation Process is another step forward in Thermoid's planned program of product improvement, assuring maximum service and lower operating costs to industry through the use of Thermoid Industrial Rubber Products.

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Main Offices and Factory • Trenton, N. J., U. S. A.
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EASIER DISPOSAL of silt, coal refuse!

MORRIS TYPE R SLURRY PUMP

Saves you the high cost of trucking refuse away!

In coal washeries and processing plants, Morris Pumps have been saving coal operators thousands of dollars in waste disposal operations. They eliminate expensive truck maintenance . . . trucking labor . . . and in many cases, they eliminate the building of roads for trucks to travel.

Morris pumping installation is simple in design . . . low in cost

Morris furnishes pumps of various types depending upon the operating conditions . . . type of refuse to be handled . . . static discharge head . . . length of pipe line through which refuse is discharged.

Morris also recommends the size of piping best suited for the job. Pipe laying expense can be kept at a minimum by using light weight abrasion resisting pipe, easily and quickly coupled . . . easily moved . . . suitable for uneven terrain.

REDUCE YOUR OPERATING COSTS—NOW!

Morris Pumps are ideally suited to the removal of fine silt and other types of refuse. They're easy to install . . . easy to maintain . . . easy to dismantle.

Write today for full information. Read how Morris' wide experience of 83 years in building and installing pumps and dredges can save you money and refuse disposal headaches. We'll also send you names of mines now using Morris installations.

MORRIS MACHINE WORKS
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MORRIS *Centrifugal Pumps*

tal Installation of Cyclone Thickeners at the Shamrock Mine," Thomas Fraser, U. S. Bureau of Mines, R. L. Sutherland, Truax-Traer Coal Co., and F. F. Giese, U. S. Bureau of Mines; "Cyclone Operating Factors and Capacities on Coal and Refuse Slurries," Donald A. Dahlstrom, Northwestern University; "Application of Screening and Classification for Improved Fine Anthracite Recovery," W. Julian Parton, Lehigh Navigation Coal Co.

Mining; Diesel Locomotives Underground; Hoisting Coal Automatically —"Proposed Method of Trackless Mining on Steeply Pitching High-Coal Seam," H. C. Livingston, Union Pacific Coal Co.; "Trends in Mechanical Loading and Strip Mining of Bituminous Coal," R. L. Anderson, U. S. Bureau of Mines; "Experience with Diesel Locomotives Underground at Blairmore," J. A. Brussett, West Canadian Collieries, Ltd.; "Automatic Hoisting at Snow Hill Coal Corp.," D. E. Renshaw, Westinghouse Electric Corp.

Aerial Contour Mapping; Economics—"Aerial Photographic Contour Maps for Strip Mines," George Hess, Aero Service Corp.; "Mining Pillars, Under Heavy Cover, in a 16-Ft. Seam of Coal," George B. Jackson, Independent Coal & Coke Co.; "The Economics of Coal for West Coast Power Generation," Claude P. Heiner, Utah Fuel Co.; "Washington Coal, a Basic Industrial Resource of the Pacific Northwest," E. R. McMillan, Northwestern Improvement Co.

Mining; Roof Control; LOX—"Coal Mine Development in Alaska," A. L. Toenges, U. S. Bureau of Mines; "Roof Problems at Sunnyside, Utah," R. G. Heers, Kaiser Co.; "The Use of Liquid Oxygen for Overburden Preparation in Open-Pit Mines," Dean Albin, Airmite Corp.

•

W. Va. Short Course Set for June 6-17

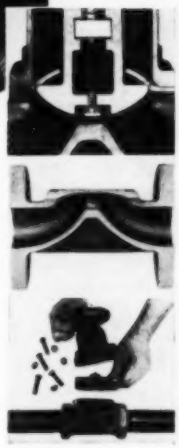
The West Virginia University School of Mines will hold its 27th annual short course in coal mining June 6-17, with classes in Morgantown, Beckley and Logan, G. R. Spindler, director, announced last month. The classes, which will meet daily from nine to three, will be taught by regular full-time staff members of the university's mining extension department. They are designed to give students intensive training in coal mining and assist workers in qualifying for supervisory positions.

At the close of the course, the West Virginia Department of Mines will hold an examination for certification of mine foremen and firebosses.

Instructors assigned to the courses are: Logan—L. E. Bradbury, Madison, W. Va.; and W. B. Talbott, Bramwell; Beckley—Hobart Watson, Oak Hill; H. D. Sydenstricker, Beckley; and W. H. McKenzie, Richwood; Morgantown—J. S. Poundstone and J. D. McClung, both of Morgantown.

Simple as pinching a rubber tube

A GRINNELL-SAUNDERS DIAPHRAGM VALVE works on a simple principle . . . it pinches tight for positive closure and opens wide for streamlined flow. The working parts of the valve are completely isolated from the fluid . . . no corrosion, no contamination and no leaks. Choice of diaphragm material. Body materials . . . cast iron, malleable iron, bronze, aluminum, stainless steel. Body linings . . . glass, lead, rubber or synthetics.



NO METAL-TO-METAL SEAT . . . The large contact area on which this flexible diaphragm seats gives positive closure even when grit, scale or other solid matter is temporarily trapped.

MINIMUM RESISTANCE TO FLOW . . . Smooth streamlined fluid passage without pockets prevents accumulation of sludge and reduces friction resistance to a minimum.

MAINTENANCE REDUCED . . . The diaphragm is the only part that normally wears out. Replaced in a few minutes without removing valve from line.

Available in various combinations of valve bodies and operating mechanisms.

99 YEARS PIPING

GRINNELL

Grinnell Company, Inc., Providence 1, Rhode Island. Branches: Atlanta • Buffalo • Charlotte • Chicago • Cleveland • Cranston • Fresno • Kansas City • Houston Long Beach • Los Angeles • Milwaukee • Minneapolis • New York • Oakland • Philadelphia • Sacramento • St. Louis • St. Paul • San Francisco • Seattle • Spokane

"WE GET EFFICIENT SIZING WITH OUR SECO SCREEN"

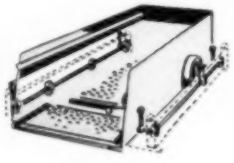
John Hockersmith, Manchester, Ky.

THIS SECO SINGLE DECK SCALPER QUICKLY TAKES OUT LUMP COAL

Here's another fine example of Seco performance on the job. The single deck, 12 ft. Seco pictured above is handling about 120 tons per hour of coal. Mr. Hockersmith reports that it takes the load as fast as the conveyor can feed it and does an excellent job of scalping. Many of the lumps that hit the screen weigh fifty pounds or more; yet, with this day after day beating, this Seco screen has required no maintenance. It runs as smooth as silk.

Seco Advanced Engineering makes the difference in performance

The cutaway illustration to the right shows the patented Equalizer Assembly. This is where Seco controls the true circular motion of the screen for smoother operation, greater tonnages and accurate sizing.



There's a SECO for every coal screening job

Seco screens for coal screening are made in single, double and triple deck models in sizes for light, medium and heavy duty screening. Send us your requirements for our expert recommendations. Also write Dept. CA3 for Coal Screening Bulletin 11.

SECO TRUE CIRCULAR ACTION VIBRATION SCREENS

SCREEN EQUIPMENT CO., INC., BUFFALO 21, NEW YORK
In Canada: United Steel Corp., Ltd., Toronto

Consol 207 Mine Wins Big Sandy-Elkhorn Award

The Big Sandy-Elkhorn Coal Mining Institute, Pikeville, Ky., Feb. 9, honored employees of Mine No. 207, Consolidation Coal Co. (Ky.), for the best 1948 safety record among the Class A mines which are members of the institute.

The basis for the bronze safety plaque awarded annually is a combination of the accident frequency and severity rates. Mine No. 207 has 300 employees.

•

Stripping Regulations Sought in Illinois

Two bills seeking regulation of strip-coal mining in Illinois were introduced into the Illinois legislature recently.

One proposal, introduced by Sens. Crisenberry and Carpentier, called for the licensing of all strip operators and the reforestation by them of land equal to acreage mined each year. The bill provides for a minimum bond of $125 and $25 an acre for over five acres.

The other bill, introduced by Sen. Fribley, imposes a tax of 4c. per ton on all coal strip-mined, with the proceeds being used for "restoring the topography of the land where strip mining operations have been conducted." The measure also provides for licensing of operators and posting a bond for conformance to the act.

•

New Buildings Sought For Mines Bureau

A bill to provide new federal buildings in Mt. Hope, W. Va., and Wilkes-Barre, Pa., to consolidate the personnel and facilities of the U. S. Bureau of Mines in those cities has been introduced into Congress by Rep. Daniel J. Flood. The proposal calls for $40,000 to cover plans and specifications for the two buildings and a total of $600,000 for their construction and equipment. Bureau of Mines' employees in Wilkes-Barre now are located in three different buildings, and a similar situation exists in Mt. Hope, Rep. Flood said.

•

Revised Mining Code Sought in Colorado

A bill seeking complete revision of Colorado's state mining code was introduced Feb. 1 into the state Senate. Sponsored by Sens. Sam T. Taylor and Ben Veltri, the 90-page proposal would require a uniform code of safety in mining, including adoption of the Federal Safety Code for coal mines. It would add a deputy chief inspector of coal mines to head safety work and would increase coal mine inspectors from six to ten.

3¼-yard ESCO coal loading dipper in pit of Sunnyhill Coal Company, New Lexington, Ohio. Shovel is a Northwest 80-D, with 22-ft. 6-in. stick.

for Greater Profit!

Smart operators like Sunnyhill Coal Company are quick to use specialized tools which increase their production. For example, the *ESCO* coal loading dipper shown above is loading from 30 to 40% more coal than could be done with this machine using standard dippers. Made especially for loading coal, more of the shovel power is used for payload, less for moving the dipper itself.

Useless weight is eliminated.

Flat lip cleans up coal with minimum of dirt.

Long, sharp teeth placed close together to give easy digging, good cleanup.

Built to Last on the Job

In spite of its light weight (the 3¼-yard bucket weighs only about 6,700 pounds), *ESCO* coal loading dippers are tough and durable. They are fabricated of alloy steel plate, with hinges, latching mechanism, teeth and tooth holders cast of wear and shock resisting manganese and high alloy steel. A solid cast lip is formed by welding web-type tooth holders together.

Detailed Information Upon Request

Let your nearest *ESCO* representative show you how these fast loading coal dippers will increase your production. Or fill in and mail the coupon. Electric Steel Foundry, 2179 N.W. 25th Avenue, Portland 10, Oregon; 728 Porter Street, Danville, Illinois. Offices in Pottsville, Pa.; Eugene, Oregon; Chicago; Honolulu; Houston; Los Angeles; New York City; San Francisco; Seattle; Spokane. In Canada, *ESCO* Limited, Vancouver, B.C.

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Dragline, Dipper, Coal Loading Buckets

ELECTRIC STEEL FOUNDRY
2179 N.W. 25th Avenue, Portland 10, Oregon
Please send additional information on Coal Loading Dippers to:

Name _____

Address _____ Zone _____

City _____ State _____

Make and model of machines used _____

Add a BIG *SAFETY* FACTOR to your hoist

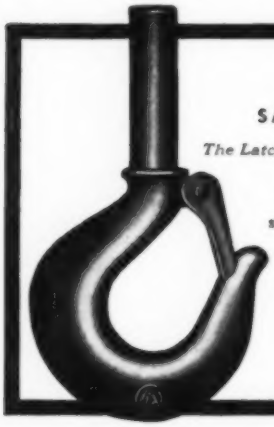
A Laughlin Safety Hook will boost the "safety efficiency" of your hoist many times . . . protecting workers against injury and equipment against damage from accidentally slipping loads.

Make sure your next Hoist is equipped with a LAUGHLIN SAFETY HOOK

Specify "Laughlin Safety Hooks" when ordering new hoists from your distributor. They pay for themselves many times over in accidents avoided.

Play safe — change over your present Hoist Hooks to LAUGHLIN SAFETY HOOKS

Order from your distributor according to the size now on your hoisting equipment . . . or state the capacity of your hoist and he will furnish the correct Laughlin Safety Hook to fit your needs.



LAUGHLIN SAFETY HOOK

The Latch Locks the Load

Drop-forged steel, heat-treated . . . stainless steel spring with pressed steel latch. Cast bronze latch on larger sizes. Available for ½ to 15 ton safe working loads.

Send for Laughlin's famous data book of fittings — ask for Catalog #145. THE THOMAS LAUGHLIN COMPANY, DEPT. 6, PORTLAND 6, MAINE.

There is a **LAUGHLIN SAFETY HOOK** *for every* **HOISTING or MATERIALS-HANDLING JOB**

3310
½ to 15 tons

3220
½ to 15 tons

3316
½ and 1 ton

3315
750 pounds

LAUGHLIN

THE MOST COMPLETE LINE OF DROP-FORGED WIRE ROPE AND CHAIN FITTINGS

14 Houses Damaged in Pennsylvania Cave-in

A cave-in of surface ground over a temporarily idle anthracite mine in the early hours of Feb. 1 dropped one house 8 ft. into the ground and damaged 13 others in a three-block area in Carbondale, Pa. More than 60 persons "fearing an earthquake fled the area in nightclothes.

The mine was leased to the DeAngelis Coal Co. by The Hudson Coal Co., which had previously closed the operation as mined-out. The mine, operated on a recovery basis by the DeAngelis company, had been down for several days as a result of restricted demand. Damage in the 1,200-ft. area was estimated at $100,000.

Renewal of an attempt to secure preventative legislation against caveins was announced a week later by the mayor of Carbondale, following a meeting of the town council. A meeting of town officials and others interested with Gov. James H. Duff to discuss remedial legislation reportedly was arranged for Feb. 15. The inclusion in new legislation of many provisions of the Kohler-Fowler Act was to be sought by the group, it was reported. The Kohler-Fowler Act was passed in 1921, and while upheld by the state courts, was declared unconstitutional by the U. S. Supreme Court in 1922.

At the same time, State Sen. Fraser P. Donlan, who helped arrange the conference with the governor, announced he planned to introduce legislation on the problem as soon as proper study of the subject could be made.

Earlier the Forty Fort, Pa., Protective League reported that the major portion of the settlement from mining in that borough was past and that little more was to be expected. Following a meeting with Benjamin H. Henderson, vice president, Lehigh Valley Coal Co., Matthew Hopkins, president of the league, reported that the league was assured that Lehigh Valley would, as in the past, continue to restore property damaged by settlement of its workings. Damage in the area was attributed mostly to a formation of quicksand, which was said to be constantly moving.

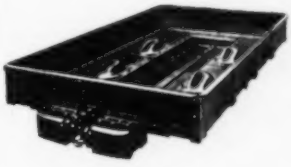
•

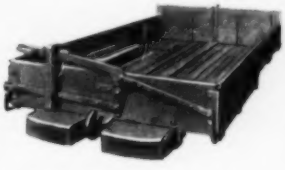
Interior Department Ups Mine Activities Budget

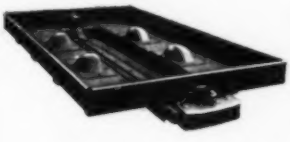
Substantial increases in the appropriations for the U. S. Bureau of Mines and the U. S. Geological Survey were incorporated in the President's budget submitted to Congress.

For the Bureau of Mines, the budget recommended an expenditure of $24,416,500, as compared with $22,160,900 appropriated for the fiscal year 1949. A total of $17,900,500 was asked for the Geological Survey, in comparison with $13,027,500 allotted for the fiscal year 1949.

CUSTOM-ENGINEERED
MINE CARS . . .







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WHEEL AND CAR CORPORATION
BRISTOL, VIRGINIA - TENNESSEE
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CONTROL COAL DUST with Pangborn Dust Control

PANGBORN Dust Control Equipment gives you:

- efficient coal dust disposal and reclamation
- increased safety
- improved working conditions
- lower equipment maintenance cost
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In scores of coal preparation plants, Pangborn Dust Control installations have paid off over and over again by improving working conditions, eliminating dust nuisances, cutting maintenance costs, doing a superior job of dust disposal and reclamation. By effectively collecting the fine coal dust produced in the operation of tipples, dry cleaning, de-dusting and other preparation facilities, Pangborn has become a by-word for making profit-stealing coal dust *behave*.

Whatever your dust problem—high machinery maintenance, nuisance, lost profits through faulty reclamation—Pangborn engineers can help you with an economical and effective solution. Let us make a *dust pocket survey* for you. No obligation—but with the information it gives us, we can recommend the right Pangborn Dust Control Equipment to rid your plant of dust hazards and nuisances.

Write for Bulletin 909A, "The Control of Industrial Dust." PANGBORN CORPORATION, 288 Pangborn Blvd., Hagerstown, Md.

Look to Pangborn for all the latest developments in Dust Control and Blast Cleaning Equipment.

STOP THE DUST HOG from stealing profits with

Pangborn DUST CONTROL

Closing of Mines Sought For Federal Inspectors

Rep. Price, of East St. Louis, Ill., last month introduced into the House of Representatives House Joint Resolution 165 to amend present law and permit federal coal mine inspectors to close mines when, in his opinion, danger to workers is present.

The resolution states: "Whenever a Federal coal-mine inspector, as provided in this Act, finds that imminent danger to employes in the mine exists, he shall immediately order the operating manager or his representative in the mine to cause all employes to be withdrawn from the unsafe area until such imminent danger is removed; Provided, however, That this subsection shall not apply to those employees that may be necessary to remove such imminent danger. Any operating manager or his representative who refuses to obey such an order shall be guilty of a misdemeanor, and upon conviction thereof, shall be punished by a fine not exceeding $ (unspecified) or 60 days, or both: Provided further, That nothing in this subsection shall be construed or operate to nullify any existing contract between mine employees and mine management, or to nullify any existing State statutes, but this subsection is intended to supplement the aforesaid statutes in the interest of increased mine safety."

Varied Program Planned for Colorado Engineers' Day

All branches of engineering will be represented at the fifteenth annual Engineers' Day of the Colorado School of Mines in Golden, April 22 and 23. The event will feature technical sessions in mining, metallurgy, petroleum production, petroleum refining, geophysics, and geology, as well as exhibits from companies engaged in the mineral industries, according to the preliminary program recently released.

Speaker at the opening session, Friday morning, April 22, will be Alfred M. Staehle, vice president, McGraw-Hill Publishing Co., Inc., and publisher of *Engineering and Mining Journal*, *Coal Age*, and *Factory Management and Maintenance*. Mr. Staehle is an engineer by profession, a graduate of Carnegie Tech. For many years he has been an observer and a student of industry in the fields covered by his publications and has taken a keen interest in the trends affecting the employment and progress of engineers. As an executive, he has been close to the developments in industrial management.

Preceding Mr. Staehle's address, there will be a rock-drilling and mucking contest between teams of students. At the same time, some 300 seniors from Colorado high schools

. . . with less time out for maintenance when you hard-face with STOODY SELF-HARDENING 21

Ask your Stoody Dealer for more information and literature on low cost STOODY SELF-HARDENING 21. He will gladly suggest where Stoody Alloys can save down-time and reduce maintenance costs.

Inside and Out STOODY SELF-HARDENING **21** slows down destructive wear on shovel buckets. With doubled life, full payloads and freedom from frequent maintenance, your tonnage benefits proportionately—with important cost savings.

STOODY SELF-HARDENING **21** is a new alloy especially designed for protecting heavy equipment. It features *exceptional abrasion resistance*, with good impact qualities; is faster and easier to apply than any comparable rod. Burns either A.C. or D.C. without slag interference. With D.C. welders, Bare STOODY SELF-HARDENING **21** handles as easily as coated electrodes, and is actually preferred by many skilled welders.

Where abrasion is a major factor, STOODY SELF-HARDENING **21** keeps all wearing equipment in top operating condition with a minimum of time and effort. Try 50 lbs. today!

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FOOTVALVE STRAINERS?

BUY'EM FROM GUYAN

An improved accessory for pumping equipment—provides straining surface approximately double the area of pipe for which the unit is tapped. Has built-in check valve.

GUYAN MACHINERY CO.
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Coal and Business Activity

		1949 to This Date	1949 Over 1948, to Date
Est. anthracite prod., week ending Feb. 5	687,000	4,282,000	—27.7
Est. bituminous prod., week ending Feb. 5	11,360,000	65,735,000	—14.3

Source: U. S. Bureau of Mines.

	Bituminous Coal Stocks (Thousands, net tons)				Consumption (Thousands, net tons)		
	Jan. 1, 1949	Day's Supply	Dec. 1, 1948	Jan. 1, 1948	Dec., 1948	Nov., 1948	Dec., 1947
Electric power utilities	24,812	90	24,894	16,788	8,508	8,261	8,450
Byproduct coke ovens	12,104	43	11,465	9,148	8,655	8,268	8,425
Beehive coke ovens	†	†	†	†	999	954	950
Steel and rolling mills	1,052	38	1,019	1,012	859	793	986
Cement mills	1,291	52	1,377	1,113	777	771	787
Other industrials	17,997	46	18,392	15,314	12,080	11,047	11,362
Railroads (Class I)	9,411	38	9,153	6,749	7,710	7,655	9,832
Retail dealers	2,706	9	3,079	2,037	8,899‡	6,210‡	10,846‡
Total	69,373	44	69,579	52,161	48,467	43,959	51,408

Source: U. S. Bureau of Mines. †Not available. ‡Retail dealer deliveries.

	Latest Week*	Month Ago	Year Ago
Business Week Index of Business Activity, wk. ending Feb. 12	199.3	199.5	191.3
Steel ingot operations (% of activity)	100.0	100.1	92.5
Electric power output (million kw.-hr.)	5,722	5,727	5,385
Crude oil production (daily avg., 1,000 bbl.)	5,330	5,428	5,347
Misc. & L.C.L. carloadings (daily avg., 1,000 cars)	70	73	76
All other carloadings (daily avg., 1,000 cars)	43	48	48
Prices, spot commodity index (Moody's, Dec. 31, 1931 = 100)	374.1	390.6	405.6
Prices, industrial raw materials (B.L.S., Aug., 1939 = 100)	271.1	279.3	277.8
Prices, domestic farm products (B.L.S., Aug., 1939 = 100)	285.7	307.4	357.5
Prices, finished steel composite (*Steel*, tons)	$97.77	$97.77	$78.59
90 stocks, price index (Standard & Poor's Corp.)	116.1	121.9	110.9

*Date of latest week in each series on request.

will take a competitive examination for three scholarships to the Colorado School of Mines. After Mr. Staehle's speech, awards will be made to the examination winners and to several outstanding underclassmen.

During the afternoon, the exhibit section will be open in the Field House, with industrial machinery and other articles of engineering importance on display.

At 2 p. m., the technical sessions in the different fields of mineral engineering will get under way. Among the speakers will be Dean A. McGee, vice president, Kerr-McGee Oil Industries, who will deliver a paper on the aspects of off-shore drilling. Dr. L. L. Nettleton, widely known geophysicist, will address the geophysics session. Dr. C. W. Perry, Phillips Petroleum Co., will speak to the petroleum refining session on the new petrochemical industry. The metallurgists will have for one of their two speakers F. R. Anderson of the Gardner-Denver Co. Other equally prominent men are scheduled to speak at the technical sessions.

An Engineers' Day dance will be held on Friday night, during which time the exhibit section will again be open to the public. Other features of the Friday program include a technical paper contest, prizes for which have been donated by the Climax Molybdenum Co., the MacKinnie Oil & Drilling Co. and the Golden Cycle Corp. An afternoon entertainment is being planned for the women who attend as visitors.

The Saturday program will include tours to the U. S. Bureau of Mines Experimental Station in Golden, additional technical sessions, and continuing inspection of the exhibits.

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What Engineers ask about

New BULL DOG V-BELTS

for use in the coal industry

Fractional Horsepower (FHP) V-Belts in Three Standard Sections. Full Range of Lengths.

Industrial V-Belts in A, B, C, D, and E Sections. Full Range of Lengths.

BWH

DEPENDABLE RUGGEDNESS

why do new BULL DOG V-BELTS have less slippage?

Exclusive BULL DOG CORDS are processed in a new way, which results in amazingly low stretch. As a result, there's less slippage, fewer adjustments, longer belt life.

why do new BULL DOG V-BELTS carry heavy power loads for longer periods?

Exclusive BULL DOG CORD SECTION has higher tensile strength. This enables Bull Dog V-Belts to absorb the shock of sudden starts and stops, to run smoothly months on end.

why do new BULL DOG V-BELTS run cool and resist flexing?

BWH laboratories developed new quality-controlled compounds for Bull Dog V-Belts. Tests prove they run cool, don't crack or deteriorate under severe flexing.

why do we say new BULL DOG V-BELTS have proved their dependability?

Like all BWH products, Bull Dog V-Belts are put through the stiffest laboratory tests. But that's only the beginning! For ten years they've been given field tests under terrific hazards. Their performance proves they've got the stuff it takes for steady, trouble-free power transmission. And since their introduction in 1948, leading industries everywhere have found this newest addition to the famous BWH line fully upholds the BWH reputation for products of dependable ruggedness.

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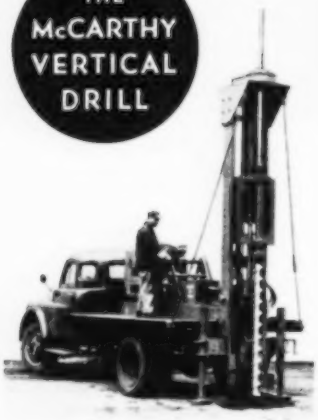

● For record-breaking performance . . . for ease of operation, you can't top a McCarthy Vertical Drill. Recently, on one difficult job, workers using McCarthy equipment drilled an 8-inch hole 100 feet deep in only 40 minutes! The derrick is raised and lowered by hydraulic power . . . finger tip controlled . . . and a 60 H. P. gasoline motor is part of the standard equipment.

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Second Consol (Ky.) Mine Completes Full First Aid Training

SOME OF THE EMPLOYEES at the Winters mine, Consolidation Coal Co. (Ky.), Ferreday, Ky., who participated 100-percent in the completion of first aid training conducted by the U. S. Bureau of Mines include: first row, Floyd Breeding (left), Harlan Sanders, Tommy Mullins, Mack Tolliver and Jacob T. Hayes; second row, Noble Riddle (left), Earl Boggs, James F. Shockley, John Sturgill, G. R. Day, Emory Caudill and Calbert Webb; third row, H. P. Whittaker (left), Elijah Wright, Floyd Holcomb, Dave Williams Sr., Glen Little, Lonnie Taylor, Acy Wright and Cecil Mann. Mine employees were joined in the course by store employees of the Elkhorn Collieries Corp. and 12 school students, sons of employees who were interested. Both day and night classes were conducted to permit those on the different shifts to participate.

MESCO ARC WELDING MACHINES

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Here's the perfect welding machine for all types of bond welding as well as general repair work in mines where 250-275 d.c. or 500-550 d.c. is used.. Both high and low styles are engineered for your convenience under any condition. Can be regulated by 20 ampere steps to full capacity of 240 amps. We also sell a complete line of accessories for electric welding.

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ernmental organizations are participating in the Engineers' Day program. Other concerns which wish to take part may obtain complete information from J. R. Medaris, chairman of Engineers' Day, Box 147, Golden, Colorado. There is no charge for exhibition space either indoors or out.

●

Setting the Record Straight

In the January, 1949, issue of *Coal Age*, p. 82, it was incorrectly stated that Stanolind, a subsidiary of Standard Oil Co. of Indiana, now is building an oil-from-gas plant at Brownsville, Tex. Officials of that company have advised that such a plant is being built by Carthage Hydrocol, Inc., in which Stanolind has no interest. Stanolind Oil & Gas Co. is building a chemical plant at Brownsville to extract chemicals from the synthetic oil produced in the Carthage Hydrocol plant.

In February, 1949, *Coal Age*, p. 148, in reporting completion of 100-percent first aid training at the Clover Splint mine, Consolidation Coal Co. (Ky.), it was incorrectly stated that the mine received a 100-percent first-aid-training certificate from the U. S. Bureau of Mines. The local union received the certificate and was the first in Harlan County to receive one.

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RED H D
RED H F
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Slow permissibles for producing coarse coal

COLLIER* C
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Fast permissibles for producing fine coal and for rock work in coal mines

HERCOGEL* A
HERCOGEL 2
(semi-gelatin)

Gelatin permissibles for wet work and rock work in coal mines

The right permissible for the job...

From these ten Hercules permissibles you can obtain the right explosive for any coal mining requirement. The descriptive booklet, "Hercules Explosives," will help you in selecting the one which most economically fits your particular needs.

HERCULES POWDER COMPANY 936 King St., Wilmington 99, Del.

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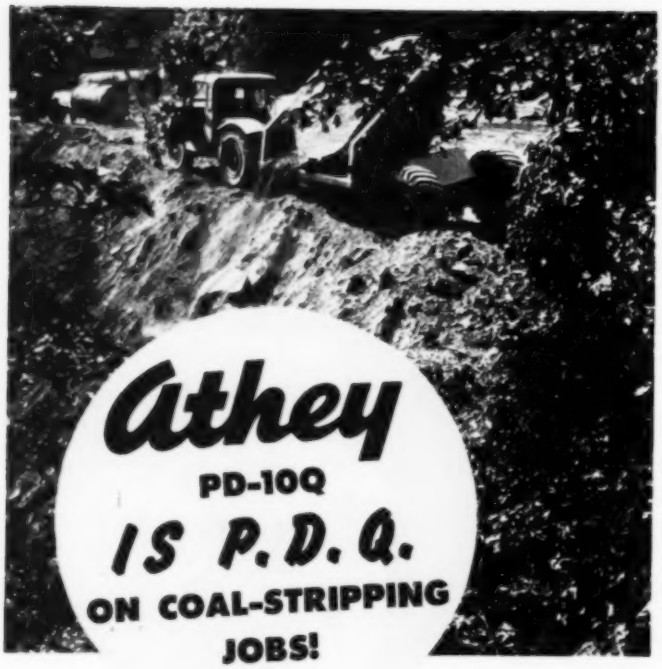

Heap 10 cubic yards of heavy material on the Athey PD-10Q Trailer's high tensile strength body — give your Caterpillar DW10 Tractor the gun. And highball to your destination.

Approach the unloading spot from either direction—the PD-10Q dumps to either side. In no time at all, it's hustling back for another load at the DW10's best speed.

Haul stripped rock, shale or slate in the PD-10Q Trailer. Its body is built to withstand the impact and abrasion of rock loading. Its wide, all-welded frame provides great stability. And heavy, hexagonal cross members absorb dumping stresses. Drawbar is welded to frame for extra strength.

The large 18.00x25 rock-lug, low-pressure tires reduce rolling resistance to give you extra speed with extra pay-pounds. See your Athey-Caterpillar dealer about the Athey PD-10Q for coal-stripping duty!

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EQUIPMENT APPROVALS

Four approvals of permissible equipment were issued by the U. S. Bureau of Mines in January, as follows:

Jeffrey Mfg. Co.—Drive unit for Class 16 Form 4 universal blower; one motor, 5 hp., 250 volts d.c.; Approval No. 2-649; Jan. 4.

Jeffrey Mfg. Co.—Power unit for conveyor; one motor, 20 hp., 250 volts d.c.; Approval No. 2-650; Jan. 10.

Joy Mfg. Co.—Type U-179-47PE face conveyor; one motor, 7½ hp., 250 volts d.c.; Approval No. 2-651; Jan. 10.

Jeffrey Mfg. Co.—Drive unit for Class 12 Form 2 universal blower; one motor, 2 hp., 250 volts d.c.; Approval No. 2-652; Jan. 11.

Walker Acting Head Illinois Mines Bureau

Harold L. Walker, head, department of mining and metallurgical engineering, University of Illinois, was appointed Feb. 7 acting director of the Illinois Department of Mines and Minerals. Prof. Walker will fill the vacancy caused by the death of James W. Starks until a permanent appointment can be made.

According to a statement by Mr. Starks shortly after his appointment (*Coal Age*, February, p. 127), Prof. Walker had been asked by the new administration to assist in the drafting of new mining laws for the state. Prof. Walker served as head of the mines department for six months in 1947, following the Centralia disaster.

•

Association Activities

Green Valley River Mining Institute has reelected as president, Arthur M. Wilson, Browder, Ky. J. W. Smith, general mine foreman, Caney Creek Coal Co., was named vice president. L. S. Lovington, Central City, was reelected secretary-treasurer; and Robert J. Hagan, Brier Creek, assistant secretary-treasurer. Named trustees of the association were: C. M. Rodman, Raymond R. Kirkpatrick, Grainger Simpson, Robert Mohnon and J. W. Smith.

•

Coal Publications

Improvements in Hydrogenation of Coal, by L. L. Hirst, L. C. Skinner and Dr. E. E. Donath. U. S. Bureau of Mines, I. C. 7486. 7 pp. 8x10½-in.; paper; mimeo. Free. Publications Section, 4800 Forbes St., Pittsburgh 13. Hydrogenation costs can be cut by improved pressure gasifica-

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heat and without damage to the cars.

The photograph shows a Kinney Car Unloader, manufactured and sold only by Heyl and Patterson, in operation on a carload of frozen coal at the Marysville Power Station of The Detroit Edison Electric Company.

The Kinney Car Unloader, which can also be used in a limited way as a Car Mover, consists of a movable bridge equipped with a trolley which carries the Unloading Spade and its operating mechanism. The bridge may run on a Crane Runway or may be designed as a Gantry or other type of bridge.

The coal is unloaded through the normal hopper openings in the bottom of the car. Ly a

olley and the

bridge it is possible to place the spade in any position over the car.

Sufficient force can be applied to the ram carrying the spade to drive it down through solidly frozen coal, forcing it through the hopper openings.

The spade can swing through an arc and move coal down into the opening previously made.

With the Kinney Car Unloader, one man can unload a 70-ton car of frozen coal in 20 minutes or less.

The Kinney Car Unloader is manufactured and sold only by Heyl and Patterson. Ask an H & P Engineer to consult with you on your problem of unloading hopper cars of frozen coal.

Ore Bridges
Railroad Car Dumpers
High Lift Turnover-Rotary
Coal Preparation Plants
Coal & Coke Handling Equipment
Boat Loaders and Unloaders
Rotary Mine Car Dumpers
Coal Crushers
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Car Hauls & Boat Movers
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Refuse Disposal Cars
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PD-10Q Trai
your Caterpil...
to your destination.

Approach the unloading spot from either direction—the PD-10Q dumps to either side. In no time at all, it's hustling back for another load at the DW10's best speed.

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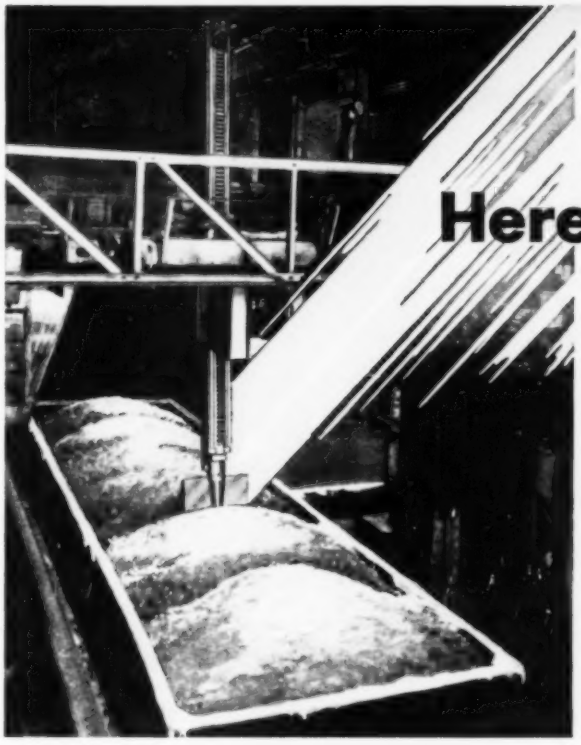

Here's a Ray of Sunshine

on the Problem of *Unloading* Hopper Cars of FROZEN COAL

At last a device is available for unloading Hopper Cars of Frozen Coal without the use of heat and without damage to the cars.

The photograph shows a Kinney Car Unloader, manufactured and sold only by Heyl and Patterson, in operation on a carload of frozen coal at the Marysville Power Station of The Detroit Edison Electric Company.

The Kinney Car Unloader, which can also be used in a limited way as a Car Mover, consists of a movable bridge equipped with a trolley which carries the Unloading Spade and its operating mechanism. The bridge may run on a Crane Runway or may be designed as a Gantry or other type of bridge.

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Rotary Mine Car Dumpers
Coal Crushers
Coal Storage Bridges
Car Hauls & Boat Movers
Bradford Breakers
Refuse Disposal Cars
Thorsten Coal Samplers
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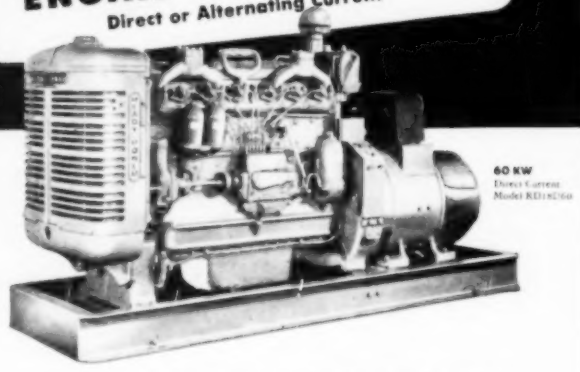

Where Electric Power—generated at the mine—is needed—Ready-Power Standardized Engine Generators are available for early delivery. Built for this service from standardized designs developed after years of experience, Ready-Power will give you—QUICKLY—Dependable, Low Cost, Electric Power.

Ready-Power Engine Generators are powered by International Harvester Engines—sold and serviced everywhere by International Harvester Power Unit Dealers.

Rated at 7½ to 85 KW AC or 7½ to 100 KW DC.

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MORE HAULAGE FOR 20% LESS BATTERY CAPACITY

Oil-tight, non-leak transmission. Use regular auto oil; change every 6 months.

Extra-long journal springs assure better trackability.
Large motor, to assure more horsepower per ton weight of locomotive.
Can be equipped with hydraulic brake.

GREENSBURG "RANGER"

This locomotive being used for main line haulage at the Blacksmith Coal Company, Novinger, Missouri. This is a 4½ ton locomotive, operating on 30" gauge track. This locomotive built from 3½ to 10 tons – either single or double motor-drive – 16" to 56½" track gauge.

All Greensburg Locomotives are **CUSTOM-BUILT** *to your requirements*

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tion, fully automatic controls, cheaper high-pressure vessels and more efficient use of heat of reaction, according to new studies looking to output of 30,000 bbl. per day of synthetic liquid fuels from coal.

The Thermal Drying of Fine Coal, by O. R. Lyons and A. C. Richardson, Battelle Memorial Institute. 23 pp. 5⅞ x 8⅞-in.; paper. Reprint available from Bituminous Coal Research, Inc., 912 Oliver Building, Pittsburgh 22. Methods for determining the difficulty of the particular drying problem, the approximate cost, temperature, weight and volume of exhaust and inlet gas, the type of dryer needed and the size required for screen or rotary dryers.

Human Factors in Safety (six sound slide films). National Safety Council, 20 N. Wacker Drive, Chicago 6. 35 mm.; 33⅓ rpm. Visual training course for foremen in safety, production and job attitudes. Titles are: "The Secret of Supervision," "Teaching Safety on the Job," "People Are All Alike," "Everybody's Different," "Teamwork for Safety" and "Safety Case Histories."

Storage of Coal. Ohio Coal Association, 705 Rockefeller Bldg., Cleveland, Ohio. Free. Methods of storing to guard against hazards and description of equipment needed for safe storage.

•

Preparation Facilities

Bernice-White Ash Coal Co., Bernice, Pa.—Contract closed with Wilmot Engineering Co. for 2½-ft.-diameter Wilmot Hydrotator for preparing Buckwheat No. 1 coal; feed capacity, 18 t.p.h.

Dominick Coal Sales Co., Paxinos, Pa.—Contract closed with Wilmot Engineering Co. for Type A Wilmot Simplex jig for preparing pea coal; feed capacity, 15 t.p.h.; also, 2½-ft.-diameter Wilmot Hydrotator for preparing Buckwheat No. 1 coal; feed capacity, 18 t.p.h.

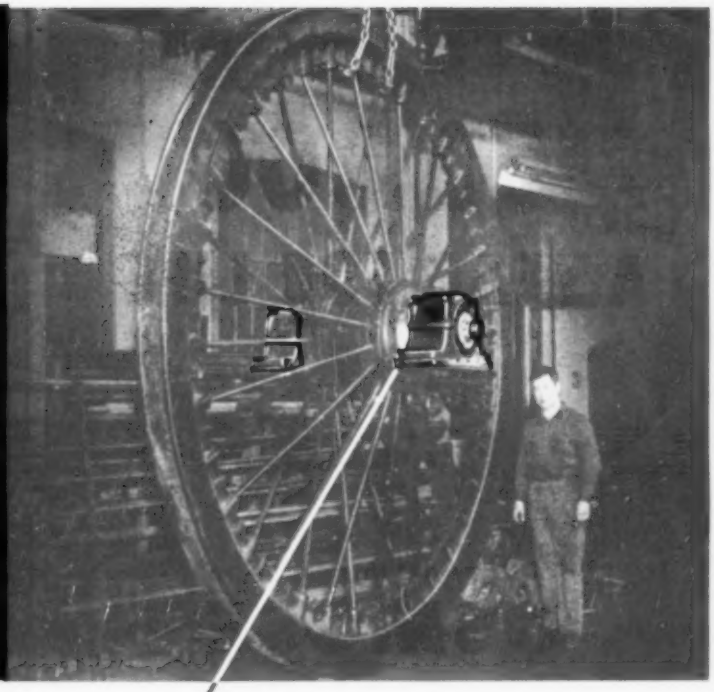
Lehigh Navigation Coal Co., Lansford, Pa.—Contract closed with Wilmot Engineering Co. for 6-ft.-diameter Wilmot Hydrotator for preparing No. 4 coal; feed capacity, 40 t.p.h.

•

Program Announced for Lehigh Anthracite Meet

New developments and trends in the mining, retailing and utilization of anthracite will be featured during the two-day session of the seventh annual Anthracite Conference to be held May 5-6 at Lehigh University, Bethlehem, Pa., according to Prof. A. Copeland Callen, head of Lehigh's department of mining engineering and

Holmes 12-foot sheave wheel and SKF Pillow Blocks . . . teamed for efficient operation



A sheave wheel takes a lot of punishment, and mine operation depends on its smooth-running efficiency. That's why Robert Holmes & Bros. specified SKF SDAF Pillow Blocks . . . on the five 12-foot diameter, bicycle type, sheave wheel assemblies furnished for Peabody Coal Company's new mine at Pana, Illinois.

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chairman of the committee planning the meeting.

Papers scheduled for presentation at the conference, which is jointly sponsored by the Anthracite Institute and Lehigh University, include:

"Planning Homes for Heating with Anthracite," by R. A. Jones, professor of architecture, University of Illinois.

"Factors Affecting Anthracite Markets," by J. D. Jillson, secretary, Anthracite Institute.

"Future Designs of Automatic Anthracite Equipment," by J. H. Simpson, general sales manager, General Machine Co., Emmaus, Pa.

"Anthracite as a Fuel for Synthesis Gas Production," by Dr. Raymond C. Johnson, vice president of research, Anthracite Institute.

"Trends in Anthracite Underground Mine Mechanization," by J. W. Buch, supervising engineer, anthracite mechanical mining section, Bureau of Mines, Schuylkill Haven, Pa.

"Recent Developments in Anthracite Mine Dust Control," by R. E. Doherty, dust control engineer, Anthracite Institute.

"Industrial Utilization of Rice Anthracite," by L. N. Burnside, manager of equipment, and A. A. Norrman, fuel engineer, Delaware, Lackawanna & Western Coal Co.

"Stoker Firing of Anthracite in Small Industrial Plants," by William Stein, Combustion Engineering Co., New York.

"Upgrading the Fine Sizes of Anthracite by Extrusion, III," by Paul A. Mulcey, James W. Eckerd, and Robert Francis, Anthracite Institute laboratory.

Two papers by Dr. C. C. Wright and J. D. Clendenin, fuel technology division, Pennsylvania State College, "Comparison of Methods of Cleaning the Fine Sizes of Anthracite" and "Thermal and Electrical Properties of Anthracite and Bituminous Coals."

"Modern Coal Yard Design," by William B. Neill, president, William Neill Constructors, New York, N. Y.

"Retail Merchandising," by A. H. Bearse, Barrows Coal Co., Brattleboro, Vt.

Chairman for the discussion groups will be: Dr. Robert T. Gallagher, associate professor of mining engineering, Lehigh University; Frank G. Fry, general sales agent, M. A. Hanna Co., Philadelphia; Cadwallader Evans, Jr., president, The Hudson Coal Co., Scranton; J. B. Warriner, chairman of the board, Lehigh Navigation Coal Co., Philadelphia; and Hugh O. Tompkins, managing director, Fuel Merchants Associations of New Jersey, Newark, N. J.

Honorary chairmen for the conference are: Dr. Martin D. Whitaker, president, Lehigh University; Frank W. Earnest, Jr., president, Anthracite Institute; C. Millard Dodson, president, Weston Dodson Co., Bethlehem; and J. B. Warriner, chairman of the board, Lehigh Navigation Coal Co., Philadelphia.

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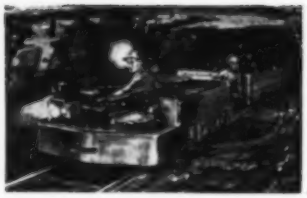
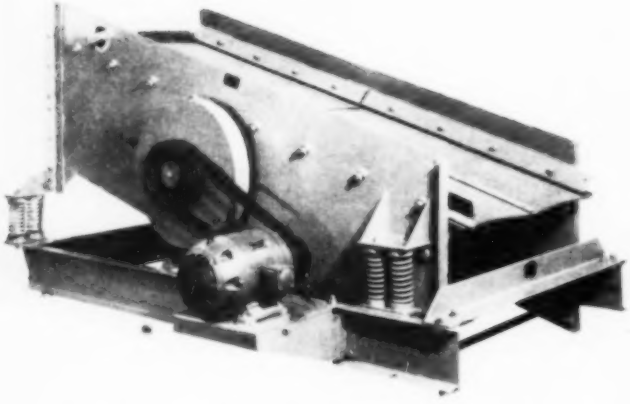


Equipment News

More Detailed Information and Descriptive Literature Normally Are Available on Request Directly to the Manufacturer



VIBRATING SCREEN—New Telsmith Vibro-King, announced by Smith Engineering Works, Milwaukee, Wis., is a two-bearing heavy-duty vibrating screen designed for wet or dry screening of coal, sand, gravel and crushed stone ore. The Telsmith Vibro-King is recommended by the manufacturer for the finest screening of medium- and small-size aggregates. The intense circular vibration is uniform on all parts of the screen cloth, is constant under light or heavy loads and is equally efficient on every deck, it is reported. The unit is available in five sizes with one, two or three decks.

SWITCH STAND—Bethlehem Steel Co., Bethlehem, Pa., has reported that its Model 1217 parallel-throw switch stand is now being furnished with a reflector target mounted directly on the stand. The 3-in.-diameter Stimsonite red and green reflectors reportedly stand out very distinctly in the dark and give a true indication of the point setting at sufficient distance to permit control of the trip. No extra connecting rods are required in installing the reflector target and there are no extra holes to be drilled in the switch rods. Over-all height to the top of the target is 12 in. above the ties.

EARTHMOVER—R. G. LeTourneau, Inc., Peoria, Ill., has announced for bottom-dump hauling the E-35 Tournahopper, a 27-yd., or 35-ton, unit traveling at speeds up to 30 m.p.h. The unit is powered by a 240-hp. two-wheel prime mover and has multiple-disk four-wheel air brakes. It features positive electric-power steer, permitting a 90-deg. turn, and has 51 percent of its loaded weight on the drive tires to give extra traction on grades and in tough going, it is reported. The Tournahopper has an exclusive clamshell dumping action, the company says, with positive electric control of the self-cleaning doors to any width, permitting either controlled ejection or fast ejection with the complete 10x10-ft. opening.

PORTABLE AUTOMATIC FIRE SPRINKLER—Stop-Fire, Inc., 125 Ashland Place, Brooklyn 1, N. Y., has announced the Underwriters' Laboratories listing of its automatic-sprink-

At Last! A WIRE ROPE HANDBOOK FOR THE MAN ON THE JOB!

It's new . . . It's different . . . It's easy to understand

J&L STEEL

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This 96-page illustrated book is especially written for the machine operator who handles wire rope constantly on his job. And its handy size—4⅜" x 7½"—fits into your pocket, ready for instant reference. It's yours for the asking!

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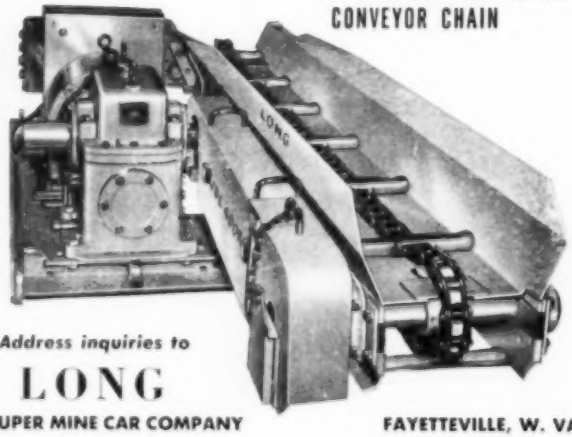

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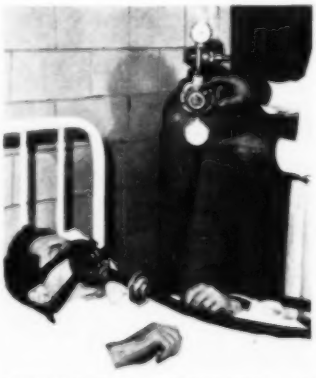
ler "portable-system" fire extinguisher. The heavy brass silver-welded unit needs no piping or other expensive installation and is ready to operate when hung up, utilizing the new fire-extinguisher fluid known as C.B.M., or Chlorobromomethane. When fire occurs, heat waves reportedly cause approved sprinkler head to discharge under pressure a wide, fast-moving spray of combined carbon dioxide and atomized Chlorobromomethane, which quickly blankets and snuffs the fire, with no residue, stain or damage, the company reports. It is said to be equally efficient on oil, grease, flammable-liquid, lacquer, paint, solvent or electrical fires and to be non-freezing.

WEIGHT PRINTER—A new-type weight printer is now being offered as an integral part of Yale Load King industrial scales that prints actual weights in numerals 9/32 in. high without additional printing or mental calculation, according to the Yale & Towne Mfg. Co., Philadelphia division, Philadelphia, Pa. Various weights in a series can be identified by printing opposite the recorded weight from one to eight symbols, numerals or letters. The printer can be adjusted to take tickets from 3x5 up to 8½x11 in., with one to four copies.



RESPIRATORY APPARATUS—A new instrument for treating pulmonary disorders resulting from exposure to certain chemicals, gases or

MEASURING SATISFACTORY PERFORMANCE

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QUAKER PACKINGS ARE "PRE-TESTED" TO ASSURE PERFECT FIT, MAXIMUM EFFICIENCY IN THE COAL INDUSTRY

Packings to be efficient must be perfect in fit . . . must form a tight seal in pumps, flanges, valve stems, piston rods to prevent leaks . . . must be of exact quality to meet the operating requirements of specific conditions.

That's why Quaker Packings are "pre-tested." Carefully calipered for size and fit . . . painstakingly checked for quality. Above we see the final test, one of many pre-tests Quaker Packings must go through before they are ready for use. Tests that are safeguards against costly leaks, troublesome shutdowns, loss of production.

There's a Quaker Packing for every type of service in the coal industry—water, air, gas, oil, acids, at extreme temperatures . . . all pre-tested for better performance above and below the ground.

HOSE THAT LASTS

. . . because it has been pre-tested to stand pressure and resist rough wear in mines. Quaker Hose is available for use with air, water, steam, volatiles, acids and gases.

FOR PEAK HORSEPOWER

Belts for conveying or transmitting power . . . Quaker has the right one to fit every need in the coal industry. Pre-tested belts that assure peak efficiency and maximum production under all operating conditions.

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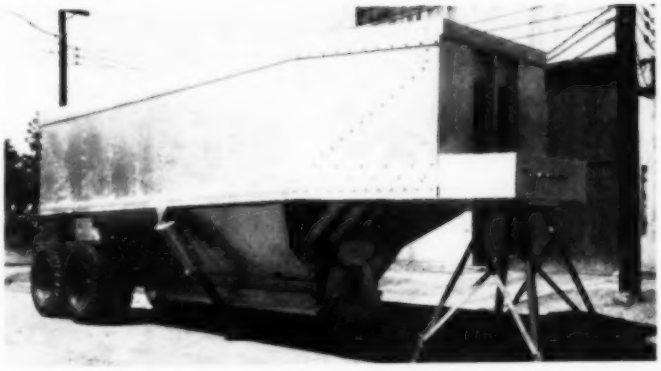
superheated air in industrial processes, or for emergency cases of asphyxiation, has been announced by Mine Safety Appliance Co., Pittsburgh, Pa. Developed during the war, the portable "M.S.A. Pneophore" differs from a resuscitator in that it administers oxygen with intermittent positive pressure only, and suction that could damage lung tissues or other parts of the respiratory system is eliminated, the company reports. In effect, the Pneophore supplants manually applied artificial respiration. Besides its value in resuscitation, the instrument has demonstrated in clinical use that it is a definite adjunct in the field of physical medicine for the treatment of occupational diseases, it is reported.



Conveyor Troughs and Ball Frames that meet exacting requirements

Hendrick Shaker Conveyor Troughs are made of a special high carbon steel that offers great resistance to abrasion, and to bending or breaking stresses under weight of the coal. The sides of the troughs are shaped to give maximum resistance to buckling.

Troughs are made in standard lengths of 10 feet, and 10 feet, 2 inches, but can be made up to 13 feet, 2 inches, in any desired size. Accuracy and uniformity in their construction are outstanding features. Hendrick Ball Frames give the troughs substantial support whatever the floor conditions. Write for full information.

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This flexible air tubing is ready for immediate, easy installation. On account of its flexibility, it can be put up or taken down in a fractional part of the time required by more rigid means of face ventilation.

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412 Poplar Street, St. Louis 2, Mo.

BOTTOM-DUMP SEMI-TRAILERS — United Iron Works Co., Pittsburg, Kan., has announced a new 54-cu.yd. bottom-dump semi-trailer which, through a design featuring greater capacity with the same gross weight, is said to offer long wear and less empty weight on return trip. The body incorporates alloy aluminum plate and structurals and the trailer is said to have the same gross weight as a 41-cu.yd. trailer made of all steel, thus offering additional pay load of 8½ tons of coal.

CONCRETE-DRILL BITS — Extra-length shanks for the Concrete Termite rotary drill bits are now available in 12-, 18-, 24- and 36-in. standard lengths, the Concrete Termites Drill Co., 1627 East Walnut St., Pasadena, Calif., reports. The bits are used with any electric drill and depend on a new patented rotary pulverizing action rather than on sharp edges or hammer-like blows.

COUPLING — A new Taper-Lock rigid coupling for rigidly connecting the ends of two shafts has been announced by the Dodge Mfg. Corp., Mishawaka, Ind. This new application of the Taper-Lock bushing will replace the old-type flange couplings in sizes up to and including 2 5/16 in. and also will be furnished in sizes up to and including 5 in. The Taper-Lock rigid coupling is said to permit easy coupling or disengagement of shafts and the equivalent of a shrunk-on fit is obtained simply by tightening two set screws. Bulletin A-441 is available from Dodge.

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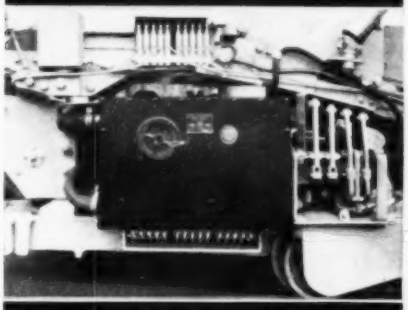

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Today's demands for higher efficiency and lower maintenance costs create new responsibilities for everyone responsible for production and plant operation.

Lubrication practices utilizing equipment that provides a system of lubrication designed for each particular requirement, contribute the ultimate to low operating costs by combining operating economies with increased production rates, quality control, and longer machine life.

You automatically improve your lubrication practices when you standardize on Lincoln Lubricating Equipment. This proven line offers you a selection, from a wide range of complete systems, for the periodic manual application of lubricants or for fully automatic, time-controlled, and powerized systems dispensing fixed quantities of lubricants at predetermined time intervals under a wide range of temperature conditions.

Ask your local wholesale distributor for Catalog No. 63 and Centro-Matic Bulletin No. 801 or write to any of the sales and service offices listed.

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- **At the right time**

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WIRE SCREENS for Dewatering or Classifying

. . . in large and small coal preparation plants . . . for all types or grades of coal.

Unique wedge-shaped members promote maximum drainage in washing, reduce clogging and give perfect rigidity to the screens. In service here and abroad, Cambri-Wedge has proved to give up to 4 times longer life than other type screens.

Cambri-Wedge Screens are available in a wide range of metals, including stainless steel—with Flat or the super-efficient Riffled Surface—and with mesh openings from .005" up.

Also available, Cambri-Wedge Wire Conveyor Belts.

FREE FOLDER! See how Cambri-Wedge Screens can save you money—speed washing or classifying—write today. Also ask about regular woven stainless screens in square or oblong mesh or weave.

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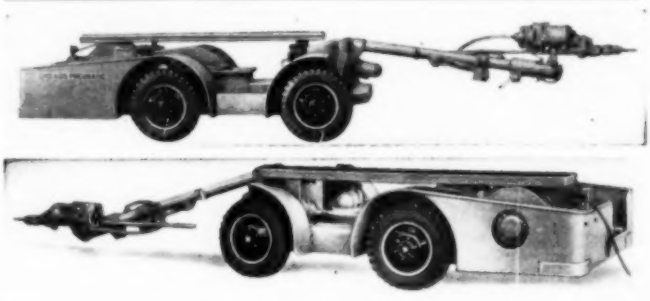
Wire cloth in rolls. Also specialized wire fabrications

OFFICES IN PRINCIPAL INDUSTRIAL CITIES

NEW 22-TON TRUCK built by the Sterling Motors Corp. Milwaukee, Wis., features dual chain drive, power steering and a 275-hp. supercharged diesel engine. Especially built for operation at Chilean copper mines, the unit has a capacity of 17 cu.yd. of rock.



DRILL—New permissible one-man Tramdrill with all controls within easy reach of the operator has been announced by the Chicago Pneumatic Tool Co., 6 East 44th St., New York 17. With a wide range of speeds and feeds, the TDS Tramdrill is said to drill shot holes in coal up to 4½-in. diameter at speeds up to 8½ f.p.m. and also can be used for drilling rock or slate (except sandstone). Only 4-in. clearance is required at roof or bottom. The drill truck has 9-in. road clearance and features automotive-type steering. The unit also can be equipped with two drill arms.

POWER SHOVEL—Marion Power Shovel Co., Marion, Ohio, has announced the Marion Type 111-M Ward-Leonard all-electric shovel, designed for heavy-duty service. As a standard shovel, the machine is equipped with a 3½-cu.yd. dipper and 33-ft. boom and for coal-loading service has a 6-yd. dipper. Introduced as a companion unit to the Marion 111-M diesel shovel, the machine features electrical control of all motions, with control of motor speeds and direction of rotation with the Ward-Leonard generator voltage control.

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Kennametal Bits

Save 6¢ per Ton...

Year Around

John W. Fordyce, progressive, cost-conscious superintendent of the Penn Valley Mining Co., Hunkers, Pa., says "During the year 1948, Kennametal U-1 Mining Machine Bits have saved 6 cents on cutting cost per ton of coal produced. The number of bit changes has been reduced 20 to 40 times. The number of man hours at the face is nearly 20 per cent lower."

Kennametal Bits have been used as standard equipment at the Penn Valley Mine for nearly three years. These are the reasons:

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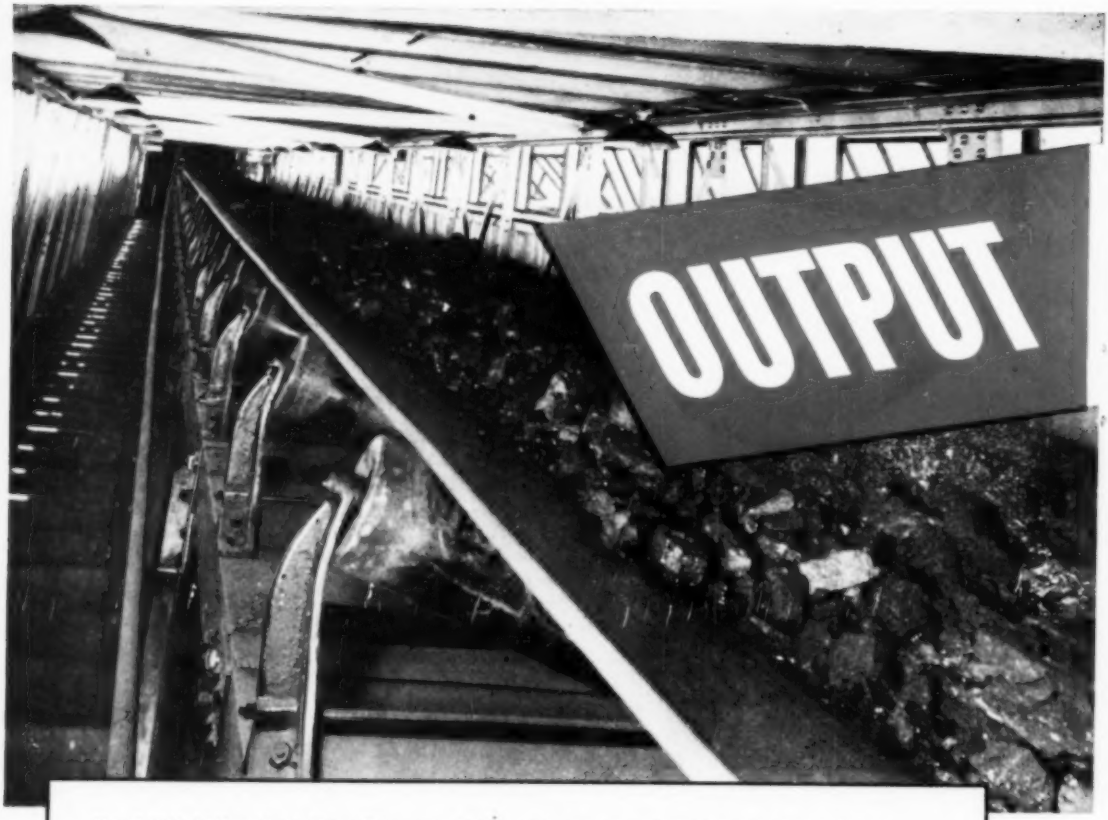
2. *A net savings on sharpening cost averaging $200 per month.*
3. *Fewer man hours required per coal face.*
4. *More places cut per shift.*

Kennametal Bits feature hard, durable Kennametal cemented carbide cutting edges—the cemented carbide that has higher strength. The harder, tougher edge that is the exclusive . . . dependable feature with all Kennametal mining tools.

We will gladly supply complete particulars. Write Mining Division, Kennametal Inc., Latrobe, Pa. for booklet M-5 today!



This 54" U. S. Matchless Slope Conveyor Belt carries run-of-mine coal from hopper to preparation plant.

Designed by Coordinated Engineering for 1000 T. P. H., this belt has been operating successfully for over 8 years—the highest tonnage era in coal history.

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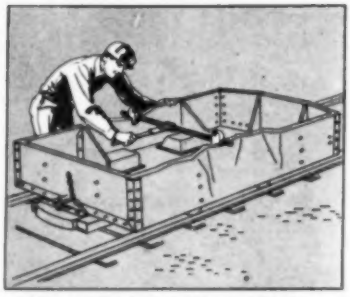
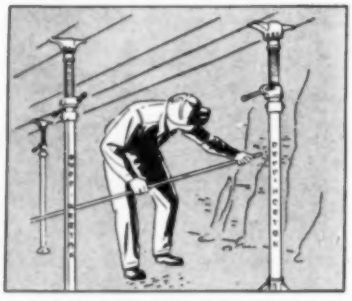
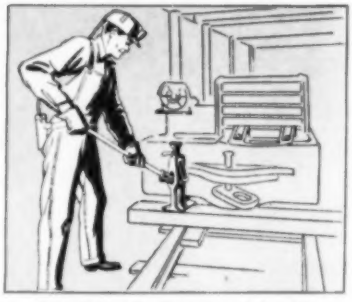
Duff-Norton Mine Jacks, available in a wide variety of styles and capacities, meet exacting requirements for every lifting, lowering, pushing or pulling job in and around your mine. These jacks more than pay for themselves in a short time with savings in time, effort, labor and money.



Push and Pull Jack used for straightening sides, ends and sills of mine cars.



Mine Roof Jacks support mine roofs, cross timbering and protect working face areas.



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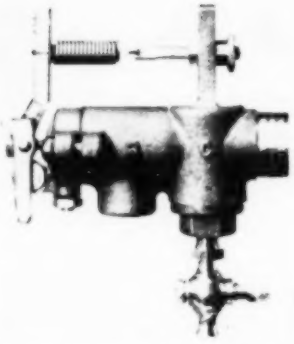
MAIN PLANT and GENERAL OFFICES, PITTSBURGH 30, PA—CANDIAN PLANT, TORONTO, ONT.

"The House that Jacks Built"



COMPRESSOR UNLOADER PILOT VALVES—R. C. Conrader Co., 1207 French St., Erie, Pa., has announced its improved plain- and strainer-type unloader pilot valves for air compressors, which are said to deliver instantaneous receiver pressure to the unloading device at predetermined maximum receiver pressure to unload compressors. At predetermined minimum receiver pressure the unit instantly shuts off receiver pressure and exhausts all pressure in the unloader device to load up compressors. The cycle of operation is repeated as receiver pressure rises and falls. The drop of pressure may be varied from 3 to 30 percent of maximum receiver pressure.

CRANE—Keystone Driller Co., 419 Wood St., Pittsburgh, Pa., has announced that the first offering of its new equipment division will be a 15- to 25-ton-capacity self-propelled one-man crane carriage or wagon on pneumatic tires, designed for all makes of cranes. Features will include, according to the manufacturer, ability to travel over rough terrain with capacity loads, a wider tread and greater ground contact area, affording increased capacity and manoeuverability, and one-man operation that not only saves labor but steps up production with a decided decrease in accidents.

•

Industrial Notes

The Koehring Co., Milwaukee, Wis., has named E. A. Brugger vice president in charge of production. A veteran of 32 years' service with Koehring, Mr. Brugger for the past 16 years has been general manager of the Parsons Co., a Koehring subsidiary in Newton, Iowa. E. O. Martinson, general manager, C. S. Johnson Co., another subsidiary, has been transferred to Koehring as chief engineer. E. W. Maas, a 31-year Koehring veteran and works manager since 1946, was named vice president and general manager, Kwik-Mix Co., a Koehring subsidiary in Port Washington, Wis.

AIRCOLITE — AIRCO SELF HARDENING — AIRCO TUNGTUBE — AIRCO TUNGSERTS — AIRCOLOY NOS. 1 & 6 — AIRCO NOS. 388, 91, 82, 53, 46 AND NICKEL MANGANESE

Special Offer

AIRCO'S NEW

HARDFACING ALLOYS

. . . a trial assortment for only $2.95

Your name on the coupon below will bring you — *at a special introductory price of only $2.95* — a trial assortment of Airco's NEW line of Hardfacing Alloys.

You will receive:

1. The NEW Aircolite Hardfacing Alloy (for oxyacetylene and electric application) — especially recommended for pulverizer hammer, coke crusher rolls, and so on, subjected to *severe abrasion and medium impact.*
2. The NEW Airco Electric Self Hardening Alloy — for bucket teeth, sizing screens and similar equipment subjected to *severe impact and abrasion.*
3. Instructions for these two alloys, plus a booklet describing Airco's line of Hardfacing Alloys.

. . . and of vital importance to you — you will receive enough of these rods to see for yourself how the NEW Airco Hardfacing Alloys extend the service life and improve the operating efficiency of your equipment.

Since this special price is good for a limited time only, we suggest that you fill in and mail the coupon below — NOW! Send it to our nearest office or authorized dealer. On West Coast: Air Reduction Pacific Company. Represented Internationally by Airco Corporation (International).

Mail this coupon today for your special assortment of the New Airco Hardfacing Alloys ▶

CA
Air Reduction
60 East 42nd Street, New York 17, N. Y.

☐ Here is my check for $2.95 — send me the special package of Airco's Hardfacing Alloys.

☐ Send me your booklet "Airco Hardfacing Alloys" — at NO cost to me.

Firm _____

Signed By _____

Address _____

City & State _____

AIRCO **AIR REDUCTION**

Offices in All Principal Cities

Headquarters for Oxygen, Acetylene and Other Gases...Carbide...Gas Welding and Cutting Machines, Apparatus and Supplies...Arc Welders, Electrodes and Accessories

Call in *SYNTRON* to Speed Up Material Handling — and Reduce Costs

"Vibra-Flow"

VIBRATORY FEEDERS

Capacities of up to Hundreds of Tons Per Hour At Instantly Controllable Rates

Feeding coal to crushers, screens, inspection belts, from track hoppers, etc.

OTHER SYNTRON EQUIPMENT

"Pulsating Magnet"

ELECTRIC VIBRATORS

Assure free-flowing bins, hoppers and chutes.

3600 powerful vibrations per minute break down arching and plugging—eliminate pounding and poking.

Small, noiseless models for hoppers—large, powerful models for big bins and bunkers.

"Vibrating"

GRIZZLIES & SCREENS

For scalping and sizing coal—separation for regrinding—screening and dewatering.

Capacities of from pounds to hundreds of tons per hour—with control of material flow.

Available as full or partial grizzlies—screens with wedge bar, slot lip screen, etc.

"Weigh-Flow"

WEIGHING FEEDERS

Provide a constant weighed flow of material, from pounds to tons per hour.

Cabinet models complete with vibrated supply hopper.

Large, heavy-duty open models.

"Vibra-Flow"

LONG VIBRATING CONVEYORS

For rough abrasives, hot sinter, etc.

Flat pan or tubular models with vibratory magnets mounted above or below the pan.

Variable control of rate of material flow.

MECHANICAL SHAFT SEALS

Eliminate shaft leakage and repacking expense and nuisance, on centrifugal pumps, transmission shafts, etc.

Available as a "packaged" unit for easy installation.

Not affected by shaft misalignment, end play, vibrating or chatter.

POWER TOOLS

For maintenance and construction work.

Electric Hammers.

Electric Drills, Grinders, Sanders and Screwdrivers.

Self-contained Gasoline Hammer Paving Breakers.

Concrete Vibrators for forms and mass pouring.

Write for illustrated literature

SYNTRON CO.

975 Lexington **Homer City, Pa.**

Allis-Chalmers Mfg. Co., Milwaukee, Wis., has named Frank H. Stohr, general manager of its Norwood works. Mr. Stohr, who formerly was executive vice president and director, Elliott Co., Jeannette, Pa., succeeds R. W. Davis. Mr. Davis, who has been associated with Allis-Chalmers for 40 years, will continue in an advisory capacity to the general manager.

Fairbanks, Morse & Co., Chicago, has promoted O. O. Lewis from assistant sales manager to sales manager. Harry L. Hilleary, for the past 17 years manager of the firm's St. Louis, Mo., branch, has been made assistant sales manager, with headquarters in Chicago. L. A. Weom, manager of the pump division, has been transferred to St. Louis to succeed Mr. Hilleary. Donald T. Johnstone, assistant manager, pump division, succeeds Mr. Weom.

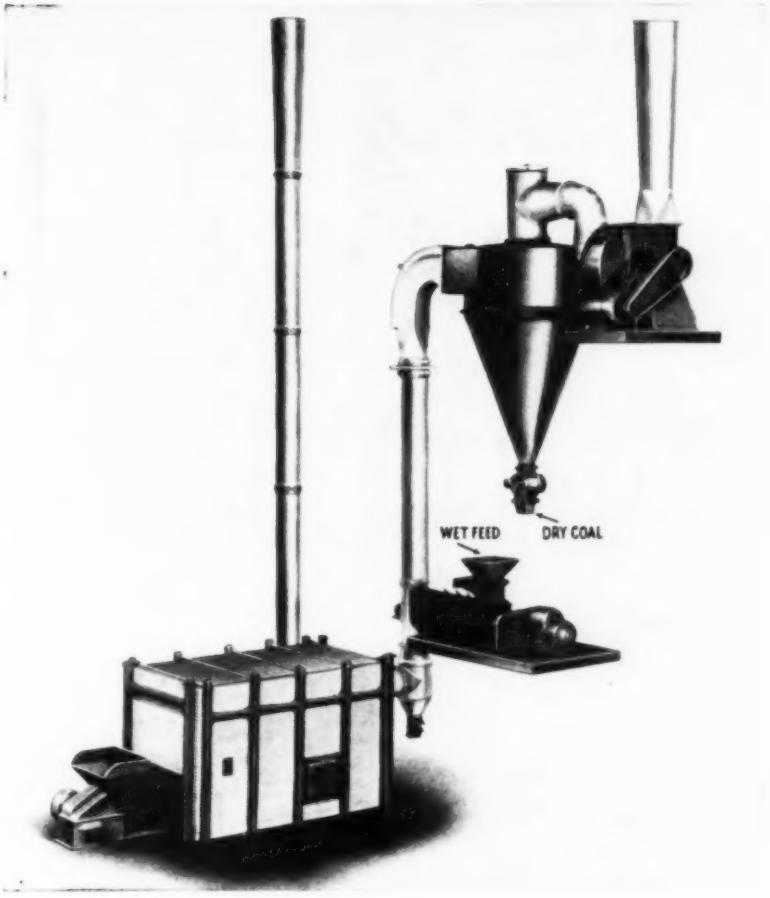
General Electric Co. has consolidated the operations of the wire and cable divisions of its apparatus and construction-materials departments, with over-all responsibility for the new division under the construction-materials department, with headquarters at Bridgeport, Conn. B. F. Ilsley, formerly manager of the apparatus wire and cable division, has been named manager of the expanded wire and cable division, in charge of engineering, manufacturing and sales. J. S. Overstreet, manager of cables sales in Schenectady, has been appointed manager of sales.

Wire Rope Institute has elected David Larkin president. Mr. Larkin succeeds E. C. Low, of John A. Roebling's Sons Co., who has become chairman of the board. As executive vice president, Broderick & Bascom Rope Co., Mr. Larkin is widely known in the wire-rope industry, with which he has been actively identified for 21 years. Other new officers of the institute are: vice president, H. C. Parker, Bergen Wire Rope Co.; secretary, W. A. Huber, American Chain & Cable Co.; and treasurer, D. W. Vernon, A. Leschen & Sons Rope Co.

Nelson L. Davis Co., Chicago, has appointed Andrew J. Gaber research engineer. He formerly was manager of the Terre Haute office, Commercial Testing & Engineering Co., and previously had been plant-control chemist at Champion No. 1 coal-preparation plant, Pittsburgh Coal Co.

Mack Trucks, Inc., New York, has appointed J. W. Biggins district manager in charge of its Louisville branch and H. J. Fikejs, district manager in charge of the Kansas City branch.

B. F. Goodrich Co., Akron, Ohio, has revised its industrial-products sales division to become the industrial- and general-products division, now including the plastic-products sales and production department. E. F. Tomlinson, general manager of the former division, has been named division general manager for the new



C-E RAYMOND

FLASH DRYING SYSTEM FOR FINE COAL

Trade Mark

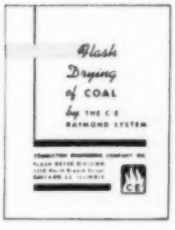
This modern method of drying fine coal is in successful operation in many different plants, ranging in capacity from around 7 tons per hour up to 175 tons, or more, of finished product.

The C-E Raymond System is designed to provide maximum efficiency and economy in drying fine coal in a size range of ⅜" x 0.

This type of equipment will handle initial surface moisture up to 12% without recirculation. By using recirculation, there is no upper limit to the initial moisture that can be handled. For example, 25% to 30% is a common requirement. The final moisture content is readily varied to suit conditions. It will range from 0% to 5% in most installations.

The C-E Raymond System is built in several different capacities, and is very flexible in meeting any plant conditions. A single drying column may be obtained for a range of 10 tons per hour up to 75 tons per hour.

In addition, several columns may be connected to a single heater for still higher capacities.



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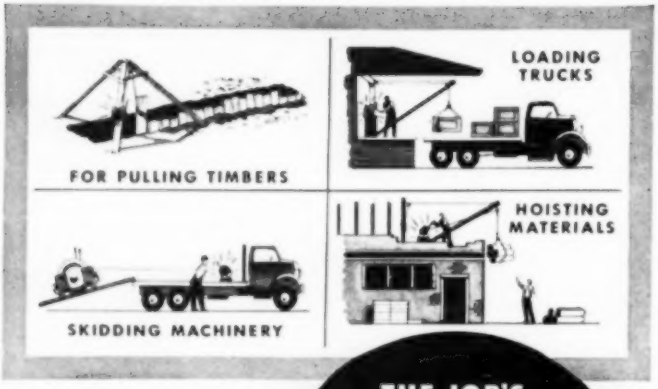
COMBUSTION ENGINEERING-SUPERHEATER, INC.

FLASH DRYER DIVISION 1315 N. Branch St., Chicago 22, Illinois



THE JOB'S A CINCH...WITH HANDIWINCH

9152

One man lifts or pulls loads up to 10,000 lbs. with the AMERICAN HANDIWINCH. Simple, rugged, weighs only 95 lbs. Carries easily, sets up anywhere. Cut steel gears, two gear ratios. Has demountable tail yoke. Triple-width drum model also available. Sold everywhere; made by AMERICAN HOIST AND DERRICK CO., ST. PAUL 1, MINNESOTA.

ALSO MAKERS OF GENUINE CROSBY CLIPS AND AMERICAN BLOCKS AND SHEAVES.

A TRULY PORTABLE BOND WELDER!

Easily dragged even in low coal. Thin design permits easy removal from cars • Quick change taps provide proper welding current for all requirements.

Write for bulletins.

GUYAN MACHINERY CO. LOGAN W. VA.

organization. Clyde D. DeLong, formerly merchandise manager of the industrial products sales division, has been made manager of the plastic-products sales department, which will be moved to the company's plastic-products plant near Marietta, Ohio. Chester F. Conner has been appointed manager of the industrial-products sales department of the industrial- and general-products division. Mr. Conner has been with the company 39 years, all in the industrial-products sales field.

Rome Cable Corp., Rome, N. Y., has established sales offices on the Pacific Coast, with O. I. Lewis, formerly assistant sales manager, in charge as Pacific Coast sales manager with headquarters in Los Angeles. The new West Coast sales organization will include district sales offices in Los Angeles, with H. S. Warren as manager; San Francisco, C. H. Kaufman, manager; Seattle, K. B. Arnett, manager; and offices in Portland, Ore., and Salt Lake City, Utah. The new managers have been principals of the Pacific Electro Sales, Inc., which had handled the Rome Cable line for several years.

Chain Belt Co., Milwaukee, Wis., has opened a new district sales office in St. Louis, Mo., at 8061 Clayton Rd., under the direction of Clarence R. Studer, district sales engineer. Mr. Studer has handled Chain Belt products in the St. Louis area for the past four years and previously was associated with General Electric for 19 years as an application and sales engineer.

Pennsylvania Refining Co., Cleveland, Ohio, has added to its sales department L. Gordon Grinnell, formerly a member of the sales staff of D-Noc Co., Cleveland; and Donald E. Hodgson, formerly assistant sales manager, Warren Refining & Chemical Co., Cleveland.

Syntron Co., Homer City, Pa., has established new district sales offices in Houston and Dallas, Tex. James B. Barth has been appointed to its Pittsburgh staff, to succeed Nelson C. DeVilling, named Dallas office manager. G. R. Stocum has been assigned to the Chicago sales force, to replace Dick McHale, new manager of the company's Los Angeles office. D. E. Nugent has been appointed to handle power-tools sales in the Kansas City, Mo., office.

Fuller Mfg. Co., Kalamazoo, Mich., has elected J. Seton Gray, president of the company since 1935, chairman of the board of directors. E. L. Ludvigsen, formerly vice president and general manager of the transmission division, succeeds Mr. Gray as president. Harold E. Brey, formerly vice president and general manager of the unit drop-forge division, has been named executive vice president. William E. Niness has been elected vice president in charge of sales and Thomas

FREEZE PROOFING

PERMANENT ODORLESS TREATMENT

BETTER STOKER FEED

CLEAN HANDLING

LESS WINDAGE LOSS

DUST-PROOFING WITH

PERMATREAT COAL SPRAY

MEANS *Cleaner* **YEAR 'ROUND DELIVERIES**

Permatreat is the answer to more deliveries of coal in summer, for housewives know dust-proofed coal won't cause additional housecleaning. More summer sales mean more time for fall and winter deliveries and thus greater profits through additional deliveries. You'll find domestic consumers "sold" on coal as a fuel when it's dust-proofed.

Ashland Permatreat Coal Spray can be furnished in low, medium and high viscosity ranges to treat all grades of coal. Talk it over with an Ashland representative. He'll gladly give you the facts and help with any preparation problem. Write today!

ASHLAND OIL & REFINING COMPANY
Ashland, Kentucky

LOWER CABLE MAINTENANCE COSTS!

RUBEROID INSULATING TAPE prolongs the life of valuable mining machine cables because it both repairs and fortifies. Tough and waterproof, it protects against nearly every danger of underground work. Here are the features that make it worth while to insist on this better tape—only Ruberoid gives you all seven features!

1. Double grip—both sides adhesive
2. Great tensile strength
3. Won't tear, ravel or pucker
4. Resists abrasion
5. Acid and alkali proof
6. Extra thick—one layer insulates
7. Exceeds A.S.T.M. specifications . . .

—by 300% in adhesiveness
—26% in tensile strength
—290% in dielectric strength!

The RUBEROID Co.
QUALITY BUILDING MATERIALS
500 Fifth Ave., New York 18, N. Y.

Backus, vice president in charge of engineering. Frank C. McManus, formerly factory manager at Kalamazoo, has been appointed manager of the transmission division, and E. L. Block, manager of the unit drop-forge division.

Western Machinery Co., San Francisco, has recently completed a licensing arrangement with Fraser & Chalmers (S. A.), Ltd., Johannesburg, South Africa, covering manufacturing and sales rights for Wemco products in the territories of Union of South Africa, Northern Rhodesia, Southern Rhodesia, Tanganyika, and the mandated Territory of Southwest Africa. Ralph B. Utt, Western Machinery's general sales manager, has recently returned from an extended tour of mining properties in Europe and Africa. Mr. Utt visited a number of important mining properties in these areas and engaged in discussion with several mining officials of international importance.

Norma-Hoffmann Bearings Corp., Stamford, Conn., has named Erwin J. Schmiel secretary-treasurer to succeed Edward C. Lennon, who is retiring from the company after 35 years of service. He previously was general auditor of the Elastic Stop Nut Corp. Ralph O. Wirtemburg has been appointed sales manager for the company, to succeed Frederick W. Mesinger, resigned. He formerly was eastern regional sales manager, New Departure Division, General Motors.

Taylor Wharton Iron & Steel Co., New York, and **Weir Kilby Corp.**, Cincinnati, have completed negotiations to combine the two companies through an exchange of stock in which Weir Kilby stockholders received Taylor Wharton stock. There will be no change in the management or corporate name of either company. O. DeGray Vanderbilt Jr. will continue as president, and O. DeGray Vanderbilt III as vice president, of Weir Kilby, and are expected to become officers and directors of Taylor Wharton. Combining the two companies is expected to permit diversification of their operations, it was reported.

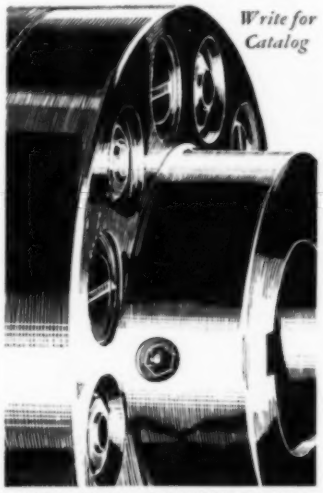
Detroit Diesel Engine Division, General Motors Corp., Detroit, has transferred Philip E. Jackson, formerly zone sales representative in the South Central states, to similar duties in the Middle Atlantic zone, which includes Pennsylvania, southeastern Ohio, West Virginia, Maryland and Virginia, with temporary headquarters at Cleveland, Ohio. A. W. Anderson, northeastern zone sales representative, has been appointed to succeed Mr. Jackson in the south central territory, which includes Alabama, Mississippi, Louisiana, Arkansas and Tennessee, with offices in New Orleans.

American Cyanamid Co., Explosives Department, New York, has appointed Wm. T. Dove district manager at

AJAX FLEXIBLE COUPLINGS

Standard Equipment on America's finest Direct-Connected Machines

Write for Catalog



AJAX FLEXIBLE COUPLING CO. INC.
WESTFIELD, NEW YORK

60 MORE *Femco* TROLLEY-PHONES
installed in mines last month

CONTINUOUS COMMUNICATION from mine-mouth to face . . .

You talk in a natural voice to any moving or stationary location anywhere in the mine.

Increases Tonnage
Promotes Safety
Speeds Operations
Improves Supervision

Ask for demonstration

FARMERS ENGINEERING AND MANUFACTURING COMPANY
549 Brushton Ave. • Pittsburgh 21, Pa.
CHurchill 5050

Vulcan Shaking-Chute Conveyor driven by 15 hp. permissible electric motor. Drive-unit and trough elevated for discharging directly into cars.

SHAKING-CHUTE and CHAIN CONVEYORS with PERMISSIBLE MOTORS

The desirability of permissible motors for driving conveyors in gaseous mines is no longer questioned. Safety MUST come first—regardless of any other consideration. Mining men can now choose, however, between permissible electric motors and compressed-air motors. Both are approved by the U. S. Bureau of Mines and each affords definite advantages under suitable operating conditions.

The accompanying illustrations show applications of both types of motors to Vulcan Shaking-Chute Conveyors but we are equally prepared to furnish them with Vulcan Chain Conveyors. In both cases deliveries are now better than has been possible for several years.

Write us regarding any Shaking-Chute or Chain Conveyor requirement. Our experienced engineers welcome opportunities to make money-saving suggestions, whenever possible, without charge or obligation. Bulletins on request.

Vulcan Shaking-Chute Conveyor driven by 10 hp. compressed-air motor equipped with governor for constant-speed operation. Chute, operating on level, is approximately 300 ft. long.

1849 VULCAN CENTENNIAL 1949

Vulcan Iron Works
WILKES-BARRE, PA., U.S.A.

Other Vulcan products include Electric Hoists, Alleasteel Sheaves, Cages and Skips, Coal Crushers and all types of Locomotives for underground and surface haulage. Write for illustrated bulletins.

WHAT ARE YOUR CORE DRILLING DEMANDS ?

SPRAGUE & HENWOOD, INC.
MEETS YOUR INDIVIDUAL REQUIREMENTS!

Core Drilling to meet your needs—that is a special advantage of Sprague & Henwood's Core Drilling Machines, designed to perform the work expected of them. They are modern in every respect . . . are engineered to meet the strenuous demands of present day core drilling jobs . . . and construction enables them to withstand long, rugged service at high speed! Available with two distinct types of swivel heads: "Screwfeed" and "Hydraulic."

You will profit by the many features offered in Sprague & Henwood's Core Drilling machines. For full details and advantages write us today.

BORTZ
Diamond Bits
Are also manufactured by Sprague & Henwood, Inc. . . . full details sent on request.

Also
Core drilling by contract

Sprague & Henwood, Inc.
DEPT. X
SCRANTON 2, PA.

Pottsville, Pa., to succeed Thomas Dove. T. B. Dunn has been named district manager at Bluefield, W. Va., replacing J. C. Evans. J. J. Freeman has been assigned to the Bluefield, office as salesman. At Pittsburgh, Pa., P. H. Johnson has been appointed to replace J. G. Roberts in the contractors' section. Messrs. Dove, Evans and Roberts continue in an advisory capacity with the company.

Pulmosan Safety Equipment Corp., Brooklyn, has moved to new quarters at 644 Pacific St. The three-story building recently acquired by the company comprises 25,000 sq.ft. and will house the company's laboratories, offices, manufacturing and warehousing facilities.

Keystone Driller Co., Pittsburgh, Pa., has formed a new Equipment Division and reportedly plans to enlarge its activity in the industrial- and construction-machinery field. The services of Robert H. Fox and Associates, Van Nuys, Calif., have been acquired to direct the engineering and marketing of the new line, along with the exclusive manufacturing rights to the designs and products of the Fox organization, which was formed some time ago to design and engineer crane carriages up to 100-tons capacity.

K. Prins & Associates, Wellston, Ohio, has appointed Earl H. Gillen sales manager. Mr. Gillen formerly was with the Morrow Mfg. Co. and has been connected with the coal-mining industry for many years as superintendent of erection, service engineer and sales engineer.

Koppers Co., Inc., Pittsburgh, Pa., has appointed F. W. Chambers, who recently returned after 1½ years in Chile for the company, manager of production for its engineering and construction division. O. H. Chambers, assistant chief engineer, has been named assistant manager of production. A. B. Fisher, Jr., a production engineer, has been made chief engineer of the division. Ragnar Berg, former chief engineer, has become consulting engineer for the division. The Koppers tar products division has promoted J. C. Macon Jr. from assistant sales manager to sales manager of the division, succeeding R. R. Holmes, who recently was named assistant general manager.

●

Trade Literature
Available Without Charge on Request to the Manufacturer

INSTRUMENT TRANSFORMERS—General Electric Co., Schenectady 5, N. Y. Bulletin GEA-6283 contains detailed information on 107 types of 412 standard instrument transformers and includes prices, ratings, and ASA accuracy classifications of units for both indoor and outdoor use, which include potential transformers, current transformers, metering

WE MAKE BOTH ELECTRO AND PERMANENT MAGNETIC PULLEYS

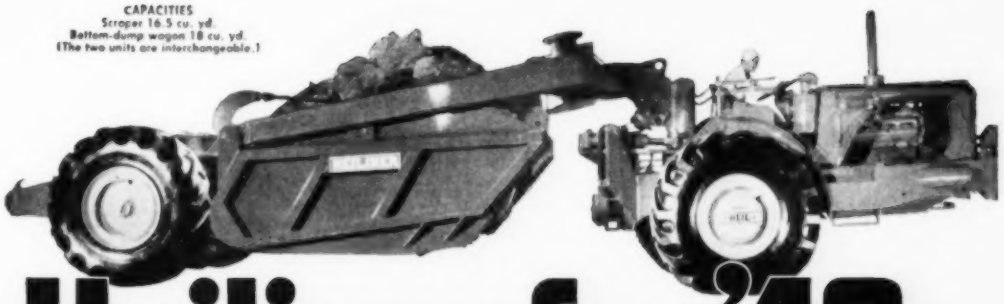
If you want the most powerful, highly efficient, Magnetic Pulley for tramp iron removal, install the Stearns Electro-Magnetic Pulley. Especially designed for heavy duty jobs, the Stearns Electro-Magnetic Pulley alone offers the ultimate for separation or concentration problems.

However, for certain light duty applications, Stearns Permanent Magnetic Pulleys (shown above) may be used. The best permanent magnetic pulleys money can buy, they require no wiring, are easily installed and eliminate operating expense.

Consult Stearns Magnetic for recommendations on your particular problem. Write for Bulletin 303 on Electro-Magnetic Pulleys or Bulletin 350 on Permanent Magnetic Pulleys.

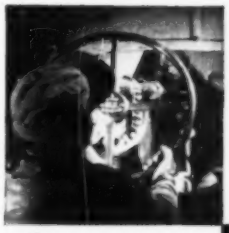
IF IT'S MAGNETIC WE MAKE IT
PULLEYS · BRAKES
DRUMS · CLUTCHES
SEPARATORS · FILTERS
ORE CONCENTRATORS
SEPARATION OR LIFTING MAGNETS
Stearns MAGNETIC MANUFACTURING CO.
661 So. 28th St. Milwaukee 4, Wis.

CAPACITIES
Scraper 16.5 cu. yd.
Bottom-dump wagon 18 cu. yd.
(The two units are interchangeable.)



Heiliner for '49

More Power... Moves More Dirt at Less Cost



Heil's patented hydraulic Hydro-Steer lets your operator drive the Heiliner with the ease of a passenger car. This ease reduces fatigue, increases safety and maneuverability, results in faster haul-cycles.

The Heiliner's patented hydraulic pump delivers a constant volume of oil regardless of engine rpm. Steering is safe and positive at all times.

Heiliner drive-wheels carry 70% of the total vehicle weight, so as to make full use of the 200-hp engine. This gives you maximum traction and a top speed of 25 mph loaded.

Heiliners cut maintenance downtime and use it to move more dirt. Both rear-end and transmission can be removed without pulling the wheels. No propping or shoring is needed for this operation.

1. New 200-hp Cummins Diesel gives you plenty of power for lugging and for high top-speed.

2. HEIL'S patented, positive Hydro-Steer gives you passenger-car ease of handling... lets you make *more* round trips.

These and many other Heiliner features make dirt-moving more profitable. Get all the facts about the Heiliner and the complete line of Heil earthmoving equipment. Check the coupon below and mail it today.

THE HEIL CO.

THE HEIL CO., Dept. 7639, 3076 W. Montana St., Milwaukee 1, Wis.

Please send me a bulletin describing all the many money-saving advantages of the amazing Heiliner.

NAME.....TITLE.....

COMPANY.....

ADDRESS.....

CITY.....STATE.....

Two girls easily lift one 200 ft. coil of Carlon E Pipe weighing only 100 lbs.

Carlon E Synthetic Flexible

PIPE

Proves amazingly durable under severe tests

For many months one of the country's largest coal companies has been making practical tests of Carlon E Pipe in several of its mines. Here are the reports:

Mine A—400 ft. of Carlon E Pipe in service 6 months shows no signs of wear or effects from acid mine water.

Mine B—200 ft. of Carlon E Pipe in service 8 months—same report and superintendent estimates that if iron pipe had been used in this section it would have been necessary to replace 4 or 5 times.

Mine C—Has 5200 ft. of Carlon E Pipe in use of which 1600 ft. has given unfailing service for 10 months. Several weeks ago 6 men installed 2 pumps and 3000 ft. of Carlon E Pipe in one day. Labor cost $84.30. Estimated labor cost for ordinary black pipe, $262.90. Quick installation of Carlon E Pipe also saved production from being cut in half by sudden water.

Write for quantity prices and further information

SPECIAL TRIAL OFFER

Carlon E is furnished in 200 ft. coils for easy handling. To enable you to give it a practical trial in your mine we will furnish one coil (200 ft.) of the 2" size at the 2000 ft. quantity size of 40¢ per foot or $80.00 on condition that if it does not prove entirely satisfactory it can be returned for full credit. *Order today.*

CARTER
PRODUCTS CORPORATION
10225 MEECH AVE. • CLEVELAND 5, O.

outfits and portable transformers. Tables give the mechanical and thermal limits of current transformers based on the latest ASA Standards.

TROLLEY-WIRE GUARD—Manhattan Rubber Division, Raybestos-Manhattan, Inc., Passaic, N. J. Bulletin 6902 features Buronik trolley-wire guard, a patented Flexlastics flame-proof and high-voltage-resistant guard. Ten advantages in use of the guard, construction details and diagrams for installation are included.

MOTOR STARTERS—Allis-Chalmers Mfg. Co., Milwaukee, Wis. Bulletin 1H07132 describes the A-C line of full-voltage starters designed to meet the requirements of any type of motor drive and covers construction features and uses of manual and magnetic across-the-line starters, across-the-line combination starters, reversing starters and pushbutton control stations.

V-BELTS—Mechanical Goods Division, U.S. Rubber Co., Rockefeller Center, New York 20. Manual designed to assist engineers in designing both multiple and light duty V-belt drives contains a drive table for multiple belts; complete sheave data including construction, dimensions, and weights; complete fractional-horsepower-drive layouts; comparison tables with information on quarter-turn drives and hexagon double V-drives; together with detailed information on U. S. Royal super-service V-belts, U. S. Rainbow steel-cord belts and standard U. S. Rainbow V-belts.

MINE JACKS—The Duff-Norton Mfg. Co., Pittsburgh 30, Pa. Bulletin "Handy Guide for Selecting Duff-Norton Mine Jacks," gives complete data on the company's full line in easily read tables and illustrates and suggests the proper type of Duff-Norton jacks for various coal mining, lifting and lowering jobs.

VENTILATION-PRESSURE RECORDER—The Bristol Co., Waterbury 91, Conn. Bulletin G617 describes the company's new mine-ventilation recording-pressure gage, said to have been completely redesigned for increased accuracy, easier use and more convenient service.

VIBRATING SCREENS—Lippmann Engineering Works, 1803 W. Mitchell St., Milwaukee 14, Wis. Bulletin 1200 describes the company's Screen-All positive eccentric vibrating screen, with specifications and dimensions for 68 sizes of singles, doubles and triple-deck units. Along with an explanation of the design and features, the booklet includes a method of determining screen area required, recommended throw and operating speeds, wire-cloth sizes and weights.

POWER DISTRIBUTION—Westinghouse Electric Corp., Box 868, Pittsburgh, Pa. Booklet offers detailed information on electric-power distribution and protection for open-pit mines and quarries, the requirements of a reliable system and the means and methods to be employed to meet them. Individual sections are devoted to electric-power distribution, ground protection, protection of power-distribution circuits, maintenance of protective apparatus and an illustrated description of Westinghouse equipment.

ELECTRIC HOISTS—Wright Hoist Division, American Chain & Cable Co., Inc., York, Pa. Folder DH-65 describes the newly designed line of Wright Speedway electric hoists, introducing the ½- to 10-ton units. Features, illustrations of each type of hoist, cross-sectional views and complete specifications are included.

EARTHMOVER—R. G. LeTourneau, Inc., Peoria, Ill. Bulletin TP-189 provides information on the new 15 Roadster Tournapull, a one-man operated self-loading dirtmover, and covers complete specifications on the 9-ton unit, features and various applications such as road maintenance, materials handling, leveling of plant and subdivision sites.

CORE-DRILLING EQUIPMENT—Sprague & Henwood, Inc., Scranton 2, Pa. Bulletin 305 illustrates and describes the company's line of diamond core-drilling

THE SAFE OPEN STEEL FLOORING IS TRI-LOK

No object over ½ square inch can pass through super-safe U-Type Tri-Lok Flooring. Fabricated without bolts, rivets or welds, it is unsurpassed for plant installation, walkways, loading platforms. Efficient distribution of concentrated loads . . . maximum free opening for light and air. Write for Bulletin JW1140.

DRAVO CORPORATION

National Distributor for the Tri-Lok Company

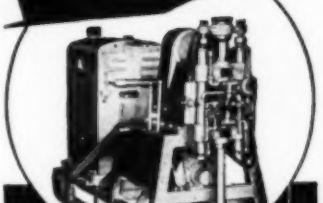
Dravo Bldg., Pittsburgh 22, Pa.

Sales Representatives in Principal Cities

DRAVO

Diamond Core Drilling

CONTRACTORS



Testing mineral properties with our light gasoline drills. SATISFACTORY COAL CORES GUARANTEED. Ground solidification by our pre-pressure grouting method for shafts. Wet mine areas, horizontal holes for drainage. Electric drills for inside mine drilling.

MOTT CORE DRILLING CO.
HUNTINGTON • WEST VIRGINIA

How the BAKER TIMBERING MACHINE

Substitutes MACHINE POWER *for* MAN POWER

The OLD METHOD
Slow, Hazardous, Costly

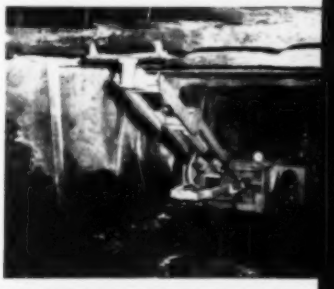
at CONSOLIDATION COAL CO. (KY.)

The BAKER METHOD
Fast, Safe, Efficient

Erecting timbers becomes a safe, mechanized operation with the BAKER Timbering Machine —a rubber-tired trackless battery-powered unit now operating successfully in a number of coal mines.

HAULS trailers loaded with timbers

Bars, posts, wedges and capboards are carried on a trailer towed behind the timbering machine. Bars or posts, as required, are slid over rollers into position for sawing and transferring to boom saddle. By utilizing a Baker Mine Tractor and extra trailers, rehandling of timbers is eliminated. Timbers are loaded on trailers in the supply yard and hauled to the Timbering Machine—the tractor returning the empty trailers.



SAWS timbers to proper length

The hydraulically-operated circular saw is placed so that even long crossbars can be cut without moving the machine. Controls are a safe distance from the saw. The initial movement of the control lever starts the saw, further movement advances it *vertically* through the timber. Weight of timber is sufficient to hold it in place without clamps.

POSITIONS crossbars against roof

Crossbars are moved across the flat deck on rollers onto the boom saddle, without lifting. Boom lifts, swings 90° to either side, retracts or advances hydraulically, controlled from operating position —permitting accurate placement of crossbar without moving the machine. Pantograph keeps bar level, and swivel joint allows it to accommodate itself to the roof. Bar is held against roof by 1000 lb. thrust while props are sawed to proper length and wedged in place.

Two models are available: for operating in high seams (46" overall height) and low seams (31" overall height). Both have U. S. Bureau of Mines Approval as permissible equipment. Write for complete information.

See the Baker Mine Tractor, Timbering Machine, Trike —and Fletcher Trailers, at the 1949 Coal Show of the American Mining Congress, Cleveland, May 9-12.

Manufactured by

THE BAKER-RAULANG CO.

1213 West 80th Street • • • Cleveland, Ohio

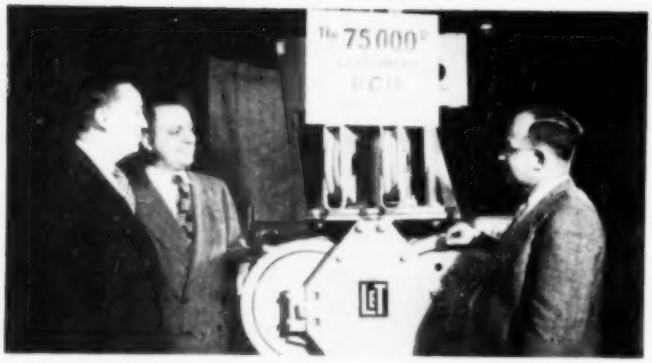
•

Exclusive Coal Mine Representatives

J. H. FLETCHER & CO.

Chicago, Illinois • • • Huntington, W. Virginia

Baker MINE EQUIPMENT



LeTourneau Marks Production Achievement

ON HAND at the completion of the 75,000th LeTourneau power-control unit to be manufactured since opening of its Peoria plant in 1935 were these officials of the R. G. LeTourneau, Inc.: Merle R. Yontz (left), vice president and treasurer, Roy E. McCluskey, vice president and general sales manager, and Harold Jeter, manufacturing manager. The unit actuates earthmoving tools towed by or mounted on tractors.

machines and accessories. "Triscast" bertz-diamond bits and sampling devices.

HARD-SURFACING—Lincoln Electric Co., Cleveland 1, Ohio. Bulletin 466 discusses various factors involved in selecting proper electrodes and correct application of arc-welded hard-surfacing and includes a detailed guide to the proper selection of Lincoln electrodes for specific jobs.

PUMPS—Ilco Pump & Machine Co., Milwaukee 4, Wis. Bulletin describes and illustrates the 7M and 10M Models of Ilco self-priming centrifugal pumps, which have 2-in. suction and discharge openings and a capacity of 7,000 and 10,000 g.p.h. respectively. Construction features and operation of the units are fully covered.

BLOWERS—Roots-Connersville Blower Corp., Connersville, Ind. Bulletin 22-27-B-13 on rotary positive blowers illustrates various applications, outlines operating advantages and principles and includes performance curves for various operating conditions for the four standard types of blowers now being offered.

MOTOR STARTERS—The Electric Controller & Mfg. Co., Cleveland 1, Ohio. Vol. I, No. 22, of the E.C.&M. *Accelerator* describes E.C.&M. Valimitor motor starters suitable for use with 2,300-4,600-volt motors on a power circuit of any capacity.

FEEDERS—McLanahan & Stone Corp., Hollidaysburg, Pa. Bulletin describes and illustrates McLanahan heavy-duty reciprocating feeders and offers typical examples of various applications, with details of operation, construction and specifications.

LUBRICANTS—Pennsylvania Refining Co., 2686 Lisbon Rd., Cleveland 4, Ohio. Folder outlines the more than 1,000 standard petroleum and specialized Penn Drake products and discusses the company's plant, service and research facilities.

HAMMER-MILL FEED CONTROL—J. B. Sedberry, Inc., Franklin, Tenn. Bulletin 149-2 discusses the operation, features and construction of the new "Constant-Feed Control" designed for adoption to the company's Jay Bee mills and said to provide proper volume control and a controlled distribution that gives a uniform depth of feed.

WIRE ROPE, ETC.—American Chain & Cable Co., Inc., Bridgeport 2, Conn. Booklet DH-509 lists the principal products manufactured by the company's thirteen divisions and seven associate companies and includes a list of sales offices, an alphabetical products index and a summary of each divisional listing.

CAGES AND SKIPS—Vulcan Iron Works, Wilkes-Barre, Pa. Bulletin A-457 illustrates and describes the various Vulcan cages, skips and gunboats, with details of construction, operation and features. The bulletin also offers information on six recent Vulcan electric hoists, Allcasteel sheaves and Vulcan slope rollers.

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ENGINEERS AND BUILDERS OF MODERN COAL OPERATION
Authoritative Valuations, and Reports of Mining Properties Equipment and Operation
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Maintenance - Inspection - Testing
POWER-HAULAGE-HOISTING-VENTILATION
1104 South Braddock Avenue, Pittsburgh 18, Pa.

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Consult these SPECIALISTS
Let them save your time by bringing their broad experience in their specialty to bear on your problems.

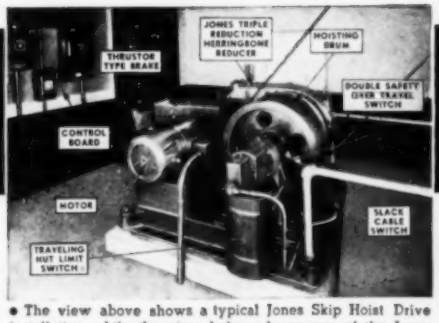
For Economical Material Handling

JONES SKIP HOIST DRIVES

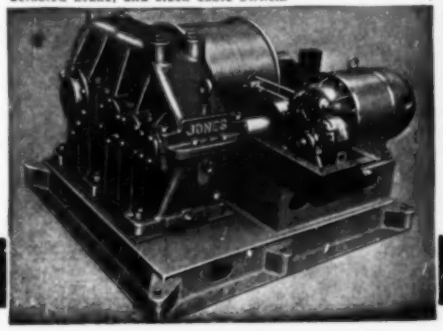
FOR speedy operation, reliable service and over-all economy the Jones Skip Hoist Drive has made a name for itself in a wide variety of material handling service. These skip hoist drives are built as complete units by the Jones organization in several types with base to take any motor specified by the purchaser. They are equipped for all the modern protective devices such as cam or nut type limit switches, solenoid or disc type brakes and slack cable switches. The drives are single, double, or triple reduction Jones Herringbone Speed Reducers, built to stand up under the many years of pounding that a skip hoist drive has to take. The shafts are supported in roller bearings, with rolling action, rack generated gear and pinion teeth to insure easiest possible starting with low starting peak loads. All reducer bearings and gears are automatic oil-bath lubricated.

The Jones organization has an extensive file of information on skip hoist drive problems and will be pleased to work with you on any problems involving such applications

W. A. JONES FOUNDRY & MACHINE CO.
4401 Roosevelt Road, Chicago 24, Illinois

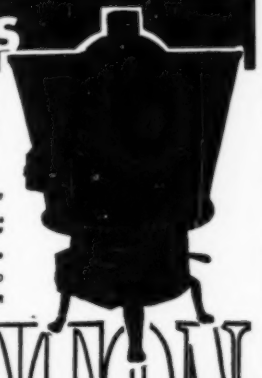


● The view above shows a typical Jones Skip Hoist Drive installation while the view below shows one of the Jones units equipped with traveling nut type limit switch, motor actuated brake, and slack cable switch.



Jones HERRINGBONE—WORM—SPUR—GEAR SPEED REDUCERS CUT AND MOLDED TOOTH GEARS • V-BELT SHEAVES ANTI-FRICTION PILLOW BLOCKS • PULLEYS FRICTION CLUTCHES • TRANSMISSION APPLIANCES

Sand Drying Stoves



The SUTTON No. 0 IMPROVED SAND DRYER includes all the time-tested principles that have made SUTTON STANDARD Sand Dryers a favorite for over forty years, plus many improvements to give you even better results. Write for catalogs, prices.

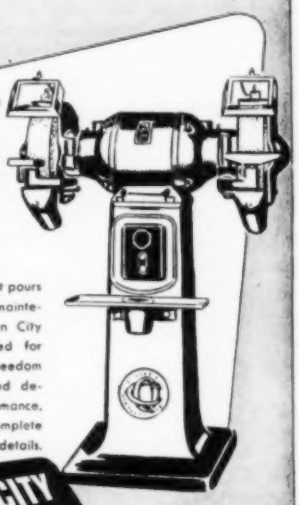
- PERFORMED RING — Entirely new design.
- A FIRE BOWL added between the grate and perforated ring. New type FIRE GRATE.
- ASH PIT DOOR EXTENSION to protect clean sand from ashes.
- 3/16" STEEL PERFORATED SKIRTING with clean-out doors.
- ECONOMY FLAME SPREADER in dome.

SUTTON

Made by **INDIANA FOUNDRY CO.**
950 Oak Street Indiana, Pa.

cut tool costs...

with rugged **QUEEN CITY GRINDERS**



It takes a top-quality grinder to stand up under the heavy work that pours through a mine maintenance shop. Queen City Grinders are noted for their durability, freedom from downtime and dependable performance. Send for catalog complete with prices and details.

QUEEN CITY MACHINE TOOL CO
215 E. 2nd St.
Cincinnati 2, Ohio
AGENTS IN PRINCIPAL CITIES

Important Questions..

about iron and steel scrap for every top business man in every industry

Q. *How* bad *is the shortage of scrap?*

A. Actually, we have enough scrap to get along, but too much of it is *light* scrap. What is badly needed today is more *heavy* scrap.

Q. *Why more* heavy *scrap?*

A. Because heavy scrap will produce *more and better* steel in *less* time.

Q. *Why is the heavy scrap shortage so* harmful *to our economy?*

A. Half of all the ingredients that are melted to make steel and castings consists of scrap iron and steel. The short supply of heavy scrap during the past year limited the production of steel mills and foundries. At the present record rate of production, there is still not nearly enough steel to meet the current and anticipated demands of our domestic economy, military requirements, and ERP. More heavy scrap will help bridge the gap.

Q. *What's being* done *about it?*

A. A drive . . . and everybody is cooperating . . . is being started for industrial scrap, to (1) help step up present steel production, and (2) *create a visible reserve of heavy scrap in the event of national emergency.*

Q. Why *is there a shortage of heavy scrap?*

A. Several reasons:

1. Very little of the 123,000,000 tons of steel and steel products exported during the war has come back as scrap.
2. With replacements scarce and expensive, much old equipment which would normally have been junked by now, is still in use.
3. A halt has been called on the junking of old vessels and military equipment which has until recently been a source of scrap.
4. The amount of heavy scrap produced in fabrication —the left-overs of machinery, etc.—is not enough to meet the demand for new steel and castings.

Q. *How about the heavy scrap that must exist in huge quantities in* Germany *and* Japan?

A. Some of this will be coming through, but not in good quantities until preparation and transportation facilities within those countries improve.

Q. *Where can* additional *scrap be obtained from domestic sources?*

A. From industrial plants which have on hand large amounts of heavy scrap in the form of obsolete machinery, idle equipment—tools, dies, jigs, fixtures, etc.—and unnecessarily large repair parts inventories. Such scrap is the best possible type for the manufacture of quality steel.

Q. *Isn't such material* ordinarily *turned in as scrap?*

A. Experience shows that plant "housekeeping" is not particularly good when plant production is high. People are too busy. However, if executives realized the critical situation, they would order the necessary steps to be taken.

Q. *How can I help in this drive?*

A. Appoint one top official in your plant as a Salvage Director —with full authority to give orders and throw out everything that is not going to be needed. Have him consult with your trade association's Steel Scrap Drive Committee. Call in your local scrap dealer. (Incidentally, the prices paid for scrap are the highest ever.) Promote your scrap drive by meetings of department heads and through plant bulletin boards and newspapers.

Q. *How do I benefit from moving scrap in addition to the money received for it?*

A. 1. You get the use of much-needed and expensive floor space now occupied by such equipment and material.
2. You eliminate the cost of keeping records and inventory.

Q. *When does the scrap drive* start?

A. Right this minute. The very next thing to do after reading this page, should be to start *your* plant's scrap drive!

Q. *What is the goal of this drive?*

A. One million tons of *heavy* scrap . . . and "housecleaning" in your plant will help.

A PUBLIC SERVICE PROJECT · THE ADVERTISING COUNCIL

SCRAPPY SAYS:

Search your plant for HEAVY SCRAP ...Help make MORE STEEL!

COAL AGE

HAMMOND'S
Safe BLASTING EQUIPMENT

EXPLOSIVE BOXES

Approved by the Pa. Dep't. of Mines, these **rigid non-conductive** explosive boxes represent a prime safety investment. Made entirely of wood—tongue-grooved and dovetailed construction—no metal parts—automatic lock—rubber band spring—moisture-resistant. Box sizes are based on 1¼" x 8" sticks.

POWDER BOX PRICES ARE AS FOLLOWS:

No. 9	$2.05 ea.	No. 25	$4.20 ea.
No. 12	2.40 ea.	No. 36	5.30 ea.
No. 16	2.85 ea.	No. 50	6.40 ea.
No. 20	3.10 ea.	No. 72	7.50 ea.

DETONATOR BOX PRICES ARE AS FOLLOWS:

No. 6, size 2½" x 3" x 6" inside $1.70 ea.
No. 8, size 2" x 2½" x 8" inside 1.70 ea.

WOOD TAMPING POLES

For tamping explosive shots. Poles are made of hardwoods . . . lengths to 10 ft. Price per lineal ft. 1" dia. 6c, 1¼" dia. 9c, 1½" dia. 10c, 1¾" dia. 12c, 1½" dia. 14c, 1¾" dia. 20c.

SECTIONAL TAMPING POLES

Poles are made of wood coupled together by means of a wooden pin held in place by a rubber band. Easily and quickly assembled. 4" dia. Head Block, $3.10 ea; 4" dia. Coupler, $3.40 ea.; Poles are 1½" in dia.; 12' long, $2.40 ea.; 14' long, $2.80 ea.; 16' long, $3.20 ea. Special diameters and lengths can be furnished.

J. V. HAMMOND CO., **Spangler, Pa.**

We also manufacture Shot Firing Units, Wooden Mallet and Wedge Sets, Trolley Poles, Sounding Sticks, Mine Rollers, Insulation Blocks and Brake Blocks.

NEW!

Self Priming
NON-SYPHONING

Centrifugal Pumps

Advanced features of design and operation of these new Deming Self-Priming Pumps set higher standards of performance for mine gathering, automatic pumping from pit, and other mine pump services.

Quick, positive priming is assured by large water chambers in casing and semi-enclosed, non-clogging impellers.

Repriming is automatic and dependable due to the non-siphoning feature which permits use of these pumps without check or foot valves (excepting where exceptionally long suction or discharge lines are encountered).

Liquid ends of these pumps can be furnished of all iron or all bronze with stainless steel shafts. Stuffing box and split gland are of conventional design. Capacities range up to 250 g.p.m. with heads up to 100 feet, at the usually preferred mine motor speeds of 1750 R.P.M. Consult your Deming Distributor or write to us for further details.

THE DEMING COMPANY
533 BROADWAY • SALEM, OHIO

DEMING
Mine Pumps

NO SIDETRACKS ON THE "AIR EXPRESS"
WITH
Fulton
FAMOUS FIREPROOF
BRATTICE CLOTH
Give fresh air a fast right of way! No sidetracking in open tunnels with tough, dependable fire-resistant Fulton Brattice Cloth to keep fresh air moving to its destination.
Fulton Brattice Cloth comes in both standard and extra-heavy weights and in widths from 36 to 96 inches. It successfully resists moisture, mildew, fungus, and rot. A sturdy, cloth marker on each easy-to-handle uniform 50-yard roll gives full specifications of the roll.
Ready for immediate shipment through your supply house or from your nearest Fulton branch.
Fulton
BAG & COTTON MILLS
New Orleans • St. Louis • Denver
New York • Dallas • Minneapolis
Atlanta • Kansas City (Kansas)
Los Angeles

One of a series of messages to help you increase your understanding of business paper advertising, and its effect on your job.

Advertising is your boy!

SOME COMPANIES think nothing of investing hundreds of thousands of dollars in new machinery, in order to trim a few cents off their manufacturing cost per unit. Yet these same companies often waste such savings in costly selling methods — by expecting their *salesmen* to beat the brush for new prospects.

That's not what salesmen are for. Their time is too valuable. And it just isn't good business to send a *man* to do a boy's work. Not when you can use advertising as your "boy" — to do the same job faster, more efficiently, and a whole lot cheaper! For instance —

It costs about $10,000 a year, on the average, to put one good salesman into the field. Assuming that he can make about 750 calls a year, you get an average cost of something over $13 per call. That's not too high if your salesman can concentrate on *actual prospects*. But it's entirely too much to spend on "missionary calls" — especially when you consider that for the same $13 (and usually much less) advertising can make well over a *thousand* such calls on the readers of magazines like this!

Did we say *boy!* Actually, advertising works more like a machine. For by mechanizing part of the selling process, it reduces your cost of *manufacturing a sale*. Just consider the five basic steps required:

1. **Seeking out prospects**
2. **Arousing their interest**
3. **Creating a preference for your product**
4. **Making a specific proposal**
5. **Closing the order**

Advertising performs the first three of these steps. It leaves your salesmen free to concentrate on the last two — which they alone can do, and do best.

Nothing you invest in will go so far toward reducing your cost of manufacturing a sale. And nowhere will this investment yield a higher return than in the business press, where your advertising calls on the greatest possible number of interested prospects, at the lowest possible cost.

COAL AGE

is a member of The Associated Business Papers who are sponsoring this campaign. If you'd like reprints of this advertisement (or the entire series) to pass along to others in your organization, we'll be glad to mail them to you, together with a copy of an interesting folder entitled, "How Much Does NO Advertising Cost."

PUMP PARTS *and* REPAIRS

FLOOD CITY has manufactured and repaired pumps for coal mine use for over 20 years. Our experience has been that the adoption of a general purpose pump for coal mine use is generally unsatisfactory, and that many so called acid resisting bronzes are readily attacked by mine sulphur water. The same engineering ability and design experience is used in the repair and modernizing of all makes of pumps, so that generally an improvement in both efficiency and maintenance cost can be expected of a Flood City rebuilt pump. We have many patterns for all types of impellers so that these parts can be made up for changed conditions, at minimum cost.

Flood City Brass & Electric Co.
Messenger & Elder Sts., Johnstown, Pa.
Branch Office: 4 Virginia St. W., Charleston, W. Va.

"We look into the Earth"

CORE DRILLING *—anywhere!*

PENNSYLVANIA Drilling CO.
DRILLING CONTRACTORS
1205 Chartiers Ave. **PITTSBURGH, PA.** WAlnut 5816

PERFORATED METAL COAL MINING SCREENS

Manufactured exactly to your specifications.
Any size or style screen, in thickness of steel wanted with any size perforation desired.
We can promptly duplicate your present screens at lowest prices.
CHICAGO PERFORATING CO.
2443 West 24th Place
CHICAGO 8, ILLINOIS
VI. 7-6757

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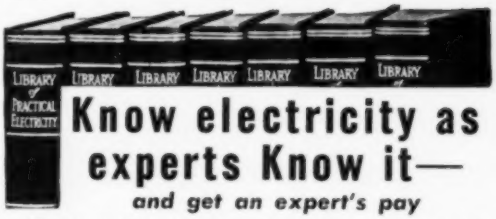
$155.00
The Cincinnati
TRADE MARK
ONE-MAN COAL DRILL
. . . specifically designed and built for drilling coal. Universal motor — operates on AC or DC current. Cuts costs. More power "pound for pound" — more efficiency day after day!
Write today for FREE illustrated bulletin.
THE CINCINNATI ELECTRICAL TOOL CO.
Division of The R. K. LeBlond Machine Tool Co.
2635 MADISON ROAD • CINCINNATI 8, OHIO



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and get an expert's pay

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Everything you need to know about: . . .
- armatures and commutators
- transformers and circuits
- switchboards and distribution systems
- electrical machinery of every type
- illumination in its every phase
- the most improved methods of lighting
- lamps and lamp effects
- how to do a complete job, from planning it, to completion

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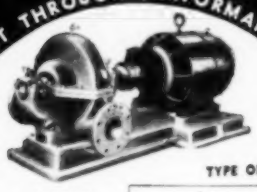

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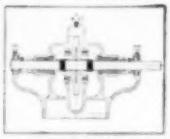

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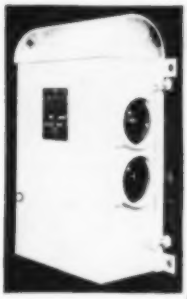

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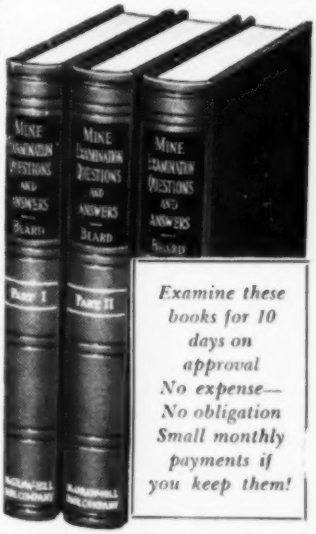
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36"	6	1/8" — 1/16"	20"	4	1/8" — 1/32"
30"	6	1/8" — 1/16"	18"	4	1/8" — 1/32"
30"	5	1/8" — 1/16"	16"	4	1/8" — 1/32"
26"	5	1/8" — 1/32"	14"	4	1/16" — 1/32"
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	12"	5	6"	6	3"	4

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5½ Ton Baldwin Type A. 36-42 Ga.

MINING MACHINES

2—112 EJ Goodman Universal, 250 v., 7½" bars.
2—12 DA Goodman 250 v. DC 8½ to 7½" bar.
2—35 B Jeffrey, 250 v., 6½ to 7½" bars.

HOISTS, CRANES AND PUMPS

300 HP Lidgerwood sgl. fixed drum, 6½' dia., 3' face. 5" flanges grooved—1⅛" cable. 300 HP G.E. 2300-6000/3/60 with magnetic control.

75 HP Diamond fr. 48" dia. 25" face, sgl.
75 HP Mead Morrison sgl. fr. drum. AC Motor.
1—50/75 HP 2 drum Meade Morrison single.
50 HP Heyl & Patterson sgl. fixed drum, 1' dia.

PROMPT SHIPMENT ON ALL SIZES A. C. AND D. C. REBUILT MOTORS.

MOORHEAD ELECTRICAL MACHINERY CO.

Pittsburgh 19, Pa. **Mayflower 7900**

Wagner
"CERTIFIED REBUILT"

M-G SETS—AC to DC

300 KW G.E. DC275 V., Synch. motor 2200 V.
250 KW Allis Ch. DC 250 V., synch. motor 440 V.
200 KW Ridgeway DC 550 V., Synch. 2300/4000 V.
150 KW Cr. Wh. DC 250 V., synch. motor 440 V.
100 KW G.E. DC. 250 V. motor, 2200 V.
80 KW Star DC 250 V., synch. motor 440 V.

D.C. MOTORS—230/250 V.

150 HP Cr. Wh. b.b. TEFC 900 RPM.
100 HP Whse. SK181 450-900 RPM.
100 HP G.E. type C 575-1150 RPM.
80 HP G. E. CDH 1,800 RPM, b.b. drip (2).
75 HP Cr. Wh. CMC, 1150 RPM, bb. (3).
75 HP Allis-Ch. E. 500 RPM, auto starter.
60 HP Whse. SK 1700 RPM.
50 HP G.E. CD 128 850 RPM.
25 HP G.E. CD85, 1750 RPM.
20 HP Whse. SK93 1150 RPM. (2).
15 HP Whse. SK 850 RPM. (3).

Complete Stock A.C. Motors—New and Rebuilt Up to 500 H.P.—Sq. Cage, Slip Ring, Synch.

SPECIAL—2—300 H.P. Allis-Ch. slipring motors, 720 RPM, 2,200 volts.

Gear Head Motors, Speed Reducers, Pumps—Blowers
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ARTHUR WAGNER CO.
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ELECTRIC MOTORS · GENERATORS

SCALES — CRUSHERS
VIBRATING SCREENS
CONVEYORS — FEEDERS
BALL BEARING IDLERS

Immediate Shipment at Reduced Prices

3-Roll Idlers: 14" belt width, $21.00
16" belt, $21.50; 18" belt, $22.30
24" belt, $23.40; 30" belt, $24.90
36" belt, $26.00; 42" belt, $27.30
48" belt width, $28.50.

1-Roll Idlers: 24" belt width, $23.35
30" belt, $24.90; 36" belt, $26.00
42" belt, $27.00; 48" belt, $28.15

Conveyor for mines and tipples priced from	$ 665.00
Picking tables	665.00
Reciprocating Plate Feeders	600.00
Stoker Coal Crusher	474.00
Large Coal Crusher	1074.00
15-ton Truck Scale	450.00
20-ton Truck Scale	510.00
33-ton Truck Scale, 34' platform	1650.00
5-ton Tipple Scale	312.00
10-ton Tipple Scale	582.00
Vibrating Screens, 2' to 5' wide, many lengths, 1 to 5 decks. All with screen cloth or plates to costumers' specifications. Priced from	648.00

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Phone: Garfield 2186; University 2832, Evenings

IRON and STEEL PIPE
New and Used
Large stocks, all sizes attractive prices

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LOCOMOTIVES

1—10 Ton Jef. with MH110, 250 V. Motors.
1—10 Ton West. with 904? Motors.
1—8 Ton G.E. with HM839 HH Motors.
1—8 Ton Jef. with MH109 250 V. HH Motors.
1—6 Ton G.E. with HM823 HH Motors.
1—6 Ton Jef. with MH88 250 V. HH Motors.

CUTTING MACHINES

2—35HH Jef. 250 V D.C. Short Wall.
1—35HH Jef. Short Wall, A.C.
3—15H 250 V D.C. Short Wall.
1—34 EJ Goodman Shaking, D.C.
1—112 AA Goodman Short Wall.

LOADING MACHINES

2—14 HU D.C. on Cats.
1—7 HU Joy D.C. on Cats.
3—8 HU Joy D.C. on Cats.
2—12 HU Joy D.C. on Cats.
2—260 Goodman, 42" on wheels.
1—L400 Jef. on wheels.

We have Motor Generator Sets, Crushers, Motors, Pumps, Compressors, Rotary Converters and etc.

TIPPINS MACHINERY CO.
PITTSBURGH 6, PA.

MINE HOIST: All steel construction, single drum, 5' dia., 3,700 ft. 1⅛" rope, single line pull capacity 73,000 lbs. with herringbone gears to operate at a speed of 200 or 600 FPM, motor 400 H.P., 450 RPM, 3 phase, 60 cycle, 2,200 volt, complete with all control equipment. Condition like NEW. Located in California.

GOODRICH SUPER LONG LIFE CORD CONVEYOR BELT (NEW):
1—Piece 1014 ft.
1—Piece 1817 ft.
1—Piece 268 ft.
6 ply, 42 oz. duck, 7/32" top cover, 1/16" bottom cover on original reels.
All NEW. NATURAL RUBBER, with or without mechaneal parts.

TURBO GENERATOR: Curtis Steam Turbine driven Generator Unit, 600 KW, 5 stage, 200 lbs. steam pressure, 3,600 RPM, with condenser, General Electric Generator, 750 KVA 2,300 volt, 3 phase, 60 cycle, with exciter, piping, valves, etc.

PUMP: Worthington 40 H.P. steam driven Centrifugal Pump, 300 lbs. steam pressure, 2,350 RPM, with steam regulator complete in new condition.

DRAGLINE: 4 yd. capacity, 110' boom, 2,300 volt, A.C.

A. J. O'NEILL
Lansdowne Theatre Building
LANSDOWNE, PA.
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REBUILT MINING MACHINES

2—112AA Goodman Universal, D. C.
4—112G3A Goodman Universal, 220 V., A.C.
2—112G3 Goodman Universal, 220 V., A.C.
1—12AB Goodman Universal, D.C., Permissible Type.
3—35B Jeffries Machines, 250 V., D.C.
6—CE7 Sullivan Machines, A.C.-D.C.
1—7B Sullivan Machine, 250 V, D.C.

LOCOMOTIVES

2—6 Ton Goodman type 33 Ball Bearing.
1—8 Ton Goodman type 32 Ball Bearing.
2—5 Ton Goodman type 2600 Ball Bearing.
1—6 Ton G.E. type 42 inch Gauge.
1—5 Ton Mancha Storage Battery Locomotive, 36 and 42 inch Gauge, Height, 43 inches. Complete with Storage Battery and Charging Panel.
2—4 Ton Westinghouse Ball Bearing.

LOADING MACHINES

2—8BU Joy 42-inch Gauge on Cats, D.C.
3—5BU Joy 42-inch Gauge on Cats, D.C.

THOMAS GILLESPIE & SON
State Rd. 67 — Bicknell, Ind.
Phones 179 and 140 L. and 149 K.

"TALK TO FALK"
USED D.C. MOTORS

7½ h.p. G.E. 230 v—450/1750 r.p.m. $150.
7½ h.p. G.E. 1 v—600/1800 r.p.m. $150.
7½ h.p. G.E. 230 v—1150 r.p.m. $95.
5 h.p. C-W Vertical, 230 v—960 r.p.m. $115.
5 h.p. G.E. 230 v—450/1800 r.p.m. $120.
3 hp. West. 220 v—825 r.p.m. $78.
3 h.p. R & M 220 v—1600 r.p.m. $45.
3 h.p. G.E. 230 v—1700 r.p.m. $45.
2½ h.p. G.E. 230 v—520/1560 r.p.m. $80.
1 h.p. G.E. 230 v—525/2100 r.p.m. $65.
1 h.p. G.E. 230 v—1150 r.p.m. $35.

FALK MACHINERY COMPANY
18 Ward St., Rochester, N. Y.
Main 6347-48

NEW and REBUILT
STORAGE BATTERY
LOCOMOTIVES
1½ to 10 Ton 13" to 56" Track Gauge
GREENSBURG MACHINE CO.
Greensburg, Pa.

BARGAINS IN COAL MINE EQUIPMENT FULLY RECONDITIONED

GENERATORS—DIESEL
3—D-13000 Caterpillar Diesel Generators, 75 KW, 440 Volts, A.C.
1—D-4400 Caterpillar. V-belted to 30 KVA AC Generator.

LARRY CARS
4 Connellsville Larry Cars, Trolley Operated, 6 Ton Capacity.

PIT CARS
150—Card Iron Works R.B. Pit Cars, 36" Gauge.
1—Card Iron Works Rock Car, 90 Cu. Ft. Capacity.

VIBRATING SCREENS
1—3' x 6' Single Surface Tyler-Niagara, V-belted to 5 HP. AC Motor.
1—3' x 6' Single Deck Plat-O, Flat Belt Drive to 2 HP.

INGERSOLL-RAND MOTOR MOUNTED PUMPS
2—2RV-1—100 GPM, 25' Head.
1—ORVF-1—20 GPM, 50' Head.
3—RV-3—120 GPM, 55' Head.
1—RVH-7½—150 GPM, 120' Head.
1—1½RVH-10—125 GPM, 200' Head.
1—2RVH-15—200 GPM, 150' Head.
1—3RVH-25—400 GPM, 180' Head.

MAGNETIC PULLEYS
1—21" Conveyor, 5'6" Centers, equipped with 24" dia. x 26" face stainless steel Ding's Magnetic Pulley, with charger. Unit driven by 1 HP 3 ph. 60 cy. Gen. Elec. Gear Motor.
2—24"x26" Ding's Magnetic Pulleys, 250 volts DC, without chargers.

FLIGHT CONVEYORS
1—8" Flight Conveyor—65' Long.
1—10" Flight Conveyor—30' Long.
2—24" Flight Conveyors—50' Long.
1—24" Flight Conveyor—85' Long.
1—30" Flight Conveyor—150' Long.

BELT CONVEYORS
1—24", 15' Long, with Ding's Pulley.
1—30", 30' Long, with 2 H.P. Gearhead Motor. New belt.
1—30", 70' Long, with driving mechanism.

COAL CUTTERS
1—Sullivan CE-7 AC Short Wall, complete with Tip-turn Truck and Reel.
New CE-7 Cutting Machine Parts.

COAL WASHING EQUIPMENT
2—Rheolaveur Launders, complete with Steel Supporting Frame.
1—60" Dia. Dividing Table, direct connected to 2 HP. DC. Motor.
1—Galigher Auto. Sampler with adjustable stroke and direct connected to a 1/6 HP. Motor.
1—12' x 10' Steel Hopper Bin.
1—70' x 12' Dorr Thickener Tank, complete with mechanism.

HOISTS
1—No. 22 Vulcan, with Man Cage, 30' Steel Headframe and 40 HP. Single Speed Elevator Type Motor, equipped with Solenoid Brake (Hoist purchased new in 1942).
1—Single Drum Gasoline Hoist, direct connected to 2⅝ x 4¼ Wisc. Gas Engine.

SLUSHER HOISTS
1—Ingersoll-Rand, 3 Drum, with direct connected 50 HP. AC. Motor, and 2—1½ Yd. Crescent Scrapers. Unit used about 60 days.

TROLLEY LOCOMOTIVES
2—7½ Ton Goodmans, 36" Gauge, 250 Volt DC.

WAGON DRILLS
1—Ingersoll-Rand, with drifter, all on pneumatic tires, used about 6 months.
1—Sullivan #IW-6, with drifter, on steel wheels. AC Motor.

COAL CRUSHERS
1—36" American Ring Type.
1—24 x 20 Jeffrey Swing-Hammer Mill.

AIR COMPRESSORS
1—8¾ x 4¾ x 5 Pneumatic, 277 cu. ft. displacement. V-belted to a D-4400 Caterpillar Diesel Engine—Semi-portable.

MINE FANS
1—8-H60 Jeffrey Aerodyne Exhausting Fan, with 75 HP. Motor—Purchased new in 1942.

MOTORS—AC
16—¼ HP. New Leland Single Phase Motors.
10—⅓ HP. New Leland Single Phase Motors.
8—½ HP. New Leland Single Phase Motors.
2—1½ HP. New Leland Single Phase Motors.
2—2 HP. New Louis Allis 3 Phase Motors.
1—3 HP. New Leland 3 Phase Motor.
1—5 HP. New Leland 3 Phase Motor.
2—1½ HP. Used G.E. 3 Phase Motors.
1—2 HP. Used Wagner 3 Phase Motor.
9—5 HP. Used G.E. 3 Phase Motors.
3—10 HP. Used G.E. & West. 3 Phase Motors.
1—20 HP. Used West. 3 Phase Motor.
2—25 HP. Used G.E. 3 Phase Motors.
2—30 HP. Used G.E. 3 Phase Motors.
3—35 HP. Used G.E. 3 Phase Motors.
1—40 HP. Used Allis-Chalmers 3 Phase Motor.
1—50 HP. Used G.E. 3 Phase Motor.
1—75 HP. Used G.E. 2200 volt, 3 Phase Motor.

MISCELLANEOUS EQUIPMENT
15 Tons—40# Rail.
Plate Frog Switches—30# to 60#.
2/0 & 1/0 & 250,000 CM Stranded R.C. Wire.
4/0 Round Trolley Wire.
Switchboard Equipment.

COMPLETE LISTING MAILED UPON REQUEST

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IMMEDIATELY AVAILABLE—MINING EQUIPMENT

MINING MACHINES

Jeffrey: 2—35B and one 25BR, 220 volt, 3 phase A.C. 28A, 250 V. 1—24B Low Vein. 4—29B, 29C, 29CR with shearing head. Also 1 on cats. Revolving head for 29C. 2—Longwall 34B.
Goodman: 12A, 12AB, 12AA, 12GAA, Shortwalls.
1—12G3, 220 volt.
1—Hitch Cutter for Cross Head timbers.
1—12H EZ Slabbing Machine, permissible type, 250 and 500 volts.
Sullivan: CE7, CE9.

SUBSTATIONS—275 volts, D. C.

1—75 KW G. E. Rotary Converter. 250 volt D. C. transformers.
220-410—2300/4000.
1—300 KW Westinghouse 3 phase converter. 275 D. C. transformers, 4000/6600 A. C.
1—100 KW Westinghouse MG set.
275 D. C. 2300 volt A. C.
1—100 KW G. E. MG Set.
275 D. C. 440 volt A. C. in portable building.

LOCOMOTIVES

Goodman: All 250 volts.
1—6 ton, 20 B 48". 1—5 ton, 2000 B.
1—5 ton, 8-30 36" gauge.
1—6 ton, type 8A.
Westinghouse Units: All 250 volts.
908, 102, 904 and 115.
Bar steel frames 10 ton, 6 ton, and 4 ton.
G.E.: All 250 volts.
6 ton, 803, 44", rebuilt.
8 ton, 829. Dismantled.
1—6 ton type HM 61, 36" or 18" ex.
Tandem Connectors with rallies, new, for use with 2—6 ton locomotives, 250 volt.

LOCOMOTIVES

5 ton 825, 44" and 36". Dismantled.
2 motors for 8 ton 830.
Jeffrey: 8 ton, 250 volts, type MH73. 1—4 ton MH 12 Rebuilt Locomotive motors and Crabs and Reels for Locomotives.

SPARE ARMATURES

Jeffrey: MH88, MH110, MH79, MH73 and MH64. 250 V. and 500 V. 29B, 35B and 48A, 35BR, 35A, 29C, 29L, 35L.
Goodman: 29B, 29C, 12A, 12AB, 112AA.
General Electric: 801, 819, 821, 825, 829, 61. 100 KW TC-C, form A. Bracket Type, 150 KW CC-E, HCC, form A.
Westinghouse: 904, 905, 102, YH2, 115, 250 V.
Sullivan: CE7, CE9 and CE10.

OTHER ITEMS AVAILABLE

Aerial Tramways.
Belt Conveyors: 1 Bucket Elevator Conveyor.
Bit Sharpeners, 2 Sullivan.
Bond Welders: Resistance and M.G. sets.
Circuit Breakers: AC and DC.
Circuit Breakers: Automatic 250 volt.
Circuit Breakers, Manual: 600 amps to 3,000 amps.
Coal Crushers: (double roll) 18"x20", (single roll) 24"x24", 12"x16".
1—30" Williams #3 Coal Crusher.
Conveyors: Scraper type. Apron and grate bar screening type.
Screens: 1 shaker 3 track, feeder reciprocating and apron pan type.

OTHER ITEMS AVAILABLE

Compressors & Jackhammers, Compensators.
Drop Bar Supports: (Gooseneck) 29B and 29C. 1 Revolving head for 29C.
Dumps: Crossover.
Field Frames. Goodman 29-A, 15 ton and others.
Generators: DC 250-275 volt, 30 KW to 125 KW. 1—AC Generator, 31.2 KVA, 2 ph. 208 volt, General Electric with Exciter.
Hoists, overhead: AC 3-60-440-220, 1 ton and 2 ton, Crabs and Boom Hoists. Also single and double drum.
Lathes: 6ft"x14" with Taper Attachment and 3-60-220 Motor.
Loading Machines: 2—Myers-Whaley #3 and 4. 1—4BU Joy loading machine.
1—12BU Joy loading machine.
Milling Machines: horizontal and vertical.
Mining Machine Trucks and 2 on Catts. for shortwall and arc wall.
Monitors.
Motor Starters and Controllers: AC and DC. Synchronous Motor Starters, full magnetic, across the line, 3-60-4150, 2—200 H.P. and 7—250 H.P. 1—100 H.P., 250 volt D.C. Both reversible.
Pumps: Rebuilt and New.
Scales: Mine Car and Truck.
1—Slate Lorry.
3—Car haul trip makers.
Transformers: 4—55 KVA 22,100/12,000 to 103/208. 3—25 KVA, 22,000/12,000 to 178/89 volts. 2—100 KVA 6,600/12,000 to 2,200.
Mine Cars: 41" gauge, rotary dump type.
1—**Rotary Dump.** 41" gauge with car feeders.
Crane: Floor Type, 3 ton, height 12 ft.

GUYAN MACHINERY COMPANY, Logan, W. Va.

CRAWLER AND LOCO CRANES

1—25 ton Marion Diesel Crawler 1½ yd. shovel front D/L, attachm'ts. 60' bm. D13000 Caterpillar Diesel engine, 22' cat, first class condition.
1—¾ yd. same as above, Marion No. 332.
2—¾ yd. Buckeye Gas Shovels and Cranes.

MINE AND SLOPE HOISTS

1—40000# Vulcan Dbl. Drum AC.
1—35000# Nordberg Sgl. Drum AC.
1—10,000 lb. cap. Vulcan Sgl. Drum Hoist 4' x 4" drum 250 HP, AC.

CONVEYORS

1—1275 ft. 42" belt Conveyor with drive.
1—300 ft. 60" ditto.
1—275 ft. 48" ditto.

CRUSHERS

1—24 x 24 Dbl. Roll Crusher.
1—4" x 8" Sturtevant Mill Roll Jam Crusher, complete with belt drive, but less motor. NEW.

DIESEL MOTORS

3—6 cyl. 280 HP Cummings Diesel Motors.

GENERATING UNIT

1—750 KVA Westhse 440/3/60 AC Generator with Northberg Uniflow Steam Engine, complete. Bargain.

AERIAL TRAMWAY

1—Aerial Cable Tramway, 1250 ft. long x 1½" rope with haul rope. Mtr. 60 HP, AC.

COMPRESSORS

1—600 ft. Ir. 2 stage motor driven compressor, Imperial Type for 220/440/3/60 AC.
1—900 ft. Sullivan WJ Angle Compound Compressor with 150 HP, GE Motor, 220/440/3/60 AC.

DERRICKS

1—25 ton, 3 drum Stiff Leg Derrick with 90' bm., AC.

HAWKINS AND CO.

134 So. Michigan Ave. Chicago 3, Ill.
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CONVEYORS

Belt, Bucket, Drag or Gravity
Shaker & Vibrating Screens
Truck Scales Coal Crushers
Coal Drills Mine Fans
Electric Motors — Floor Cranes
Mining and Stripping Equipment

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Pittsburgh 22, Pa.

HIGH GRADE TOOLS

BROWN & SHARPE #2B DOUBLE OVERARM LATE TYPE MOTOR DRIVE.
14x48x72 Gallmeyer Livingston Surface Grinder.
#3-12 Arter Surface Grinder.
24", 36" & 42" Bullard Vertical Turret Lathe.
2' to 7' Plain Radial Drills.
16" and 24" G. & E. Shapers.
New No. 3-6 Davis Keyseating Machine.
18"x54" centers Lodge & Shipley, late type, Lathe.
#4 Cincinnati Vert. Miller, late type.
120 A.U. Gardner Opposed Wheel Grinder.
20" Cincinnati Univ. Shaper, late type.
#2M Cincinnati Vert. Mill.

Also various other machine tools.

Send us your inquiries

Cincinnati Machinery Company, Inc.
217 E. Second St. Cincinnati 2, Ohio

CARS & LOCOMOTIVES:

80 Ton Whitcomb Diesel-Elec. Locomotives.
100—50 ton cap. Gondolas.
35—50 ton cap. Flat Cars.
8—100-ton, 45-ton, 30-ton Diesel Locomotives.
50—20 yd. cap. Air Dump Cars.
6—10, 16, 20 & 30 ton Gas Locomotives.
150—8,000 & 10,000 gal. cap. Tank Cars.

STEEL TANKS:

30—8,000, 10,000 and 20,000 gallon capacity.
9—80,000 & 20,000 bbl. cap.

LARGE SHOVELS—DRAGLINES

1—17 Yd. Cap. Bucyrus Erie Elec. Shovel.
2—10 Yd. Cap. Marion Elec. Shovels.
1—8 Yd. Cap. Marion Elec. Shovel.
1—7 Yd. Cap. Marion Diesel Dragline.
1—6 Yd. Cap. B. E. Monighan Diesel Dragline.
1—3 Yd. Cap. Marion Elec. Shovel.
1—4 Yd. Cap. Marion Diesel Shovel.
3 Steam Shovels—37-, 5, 6 and 8 Yd.

R. C. STANHOPE, INC.
60 E. 42nd Street New York 17, N. Y.

BRAND NEW WIRE ROPE FOR SALE

Improved Plow Steel, preformed, Ind. Wire Rope Center. ⅞" dia., 6x19, 15 reels—2,000 ft. each reel.
Also 1⅛"; 1¼"—6x19, Ind. Wire Rope Center.
In addition to, all sizes hemp center, both black and galv.
Drop forged galv. wire rope clips, all sizes.
Chain hoists, proof coil chain, conveyor belting.
Prices way below market. Immediate shipment.

TERRENCE P. WYNN
BOX 118
NEW YORK 33, N. Y.

MINING EQUIPMENT

9 ton Westghs. 36" ga. battery type locomotives, new 1945.

45 ton Davenport diesel electric locomotive, new 1942.

80 ton Lima steam switching locomotive, new 1944.

1½ yd. Lima 701 diesel dragline, new 1942.

MISSISSIPPI VALLEY EQUIPMENT CO.
511 Locust St., St. Louis 1, Mo.

ROTARIES — M-G SETS

2—200 kw G.E. Rotary Converters, 250 volts DC, 1200 rpm, with trans. & swbds.

4—150 kw G.E. Syn. Motor-Generator Sets, 275 volts DC, 1200 rpm—2300/4000 volts AC, 3 phase, 60 cycle.

RECTIFIERS

RECTIFIERS (Low Height)—Any Capacity—Complete—Fully Automatic

R. H. BENNEY EQUIPMENT CO.
5024 Montgomery Road
Norwood 12, Ohio

FOR SALE

4 Goodman Style G20B77 permissible Shaker Conveyors, latest type with 300 ft. size 3 troughs, manual Type HAD duckbill and 20 HP Westinghouse AC motor, 3 phase, 60 cycle, 220 volt, 1160 RPM.
4 Sullivan Class 7B Cutting Machines, with 50 HP AC motor, 3 phase, 60 cycle, 220 volt, anti Rowdil cutter bar and chain, 9 ft. long, 5" kerf.
4 Chicago Pneumatic Style 874-700 post mounted coal drills, 220 volt, 60 cycle, 3 phase, AC.
All of above to include usual accessories and guaranteed to be in A-1 condition. New in 1943.

KAISER COMPANY, INC.
Iron & Steel Division
Sunnyside, Utah

REBUILT EQUIPMENT—READY TO SHIP

SLIP RING MOTORS—3 PHASE 60 CYCLE

No.	H.P.	Make	RPM	Volts
1 NEW	400	Westinghouse	600	2200
1	250	Allis Chalmers	870	2200
1	200	Westinghouse	1800	220/440
1	150	General Electric	1800	220/440
1	150	Westinghouse	1150	220/440
1	125	Westinghouse	860	2200/220/440
1	100	Westinghouse	720	2200/220/440
1	100	Triumph	580	550/220/440
1	75	General Electric	600	550/220/440
1	75	General Electric	720	220/440
1	75	General Electric	900	220/440
1	75	Westinghouse	1800	220/440
1	60	Westinghouse	900	220/440
1	60	General Electric	720	220/440
2	50	Westinghouse	870	220/440/2200

250 VOLT D.C. GENERATORS

No.	KW	Make	Type	RPM
3	250	Westinghouse		1200
1	200	Westinghouse	SK	580
1	110	Westinghouse	SK-190	700
8	100	Reliance	1050-T	560
1	100	Westinghouse	SK-183	720
1	100	Westinghouse	SK-190	720
1	100	Westinghouse	SK-180	900
6	100	Delco		1200
1	100	General Electric	RC-58	850

GENERATORS CON'T.

1	100	Westinghouse	SK	850
1	100	General Electric	RCP-36	2100
1	75	Allis Chalmers		850
2	75	Westinghouse	SK	1400
1	60	Westinghouse	SK	2100/1950
1	60	Westinghouse	SK-153	1100
1	50	Westinghouse	SK-180	400
1	50	General Electric	DLC 203	850
1	50	Westinghouse	SK-143	1100

MOTOR GENERATOR SETS—250 V., D.C.

Motors: 220 440 or 2200 volts—3 phase 60 cycle.

No.	KW	Make	RPM
3	250	Westinghouse	1200
1	200	Westinghouse	720
2	200	Westinghouse	1200
1	100	Westinghouse	700
1	100	General Electric	900
1	100	Westinghouse	600
1	100	General Electric	1800
1	100	Reliance	580
1	100	Delco	1200
2	90	Westinghouse	850
4	75	Westinghouse	720
1	75	Westinghouse	1200
1	60	Westinghouse	1200
1 NEW	50	General Electric	1800
3	40	Westinghouse	900
2	30	Westinghouse	720

WILLIAMS COAL CRUSHER

With hopper opening of 10x25, speed 900-1200 rpm., drum dia. 20".

230 V. D.C. MOTORS

Qu.	HP	Make	Type	Speed
2	200	Reliance	1070T	400
1	150	Gen. Electric	RCP-36	1700
3	125	Westinghouse	SK-190	850
4	100	Reliance	1050T	400
2	100	Westinghouse	SK-180	640
1	100	Gen. Electric	RC-58	650
1	100	Westinghouse	SK	650
2	90	Westinghouse	SK-183	575
1	75	Westinghouse	SK-160	850
3 new	75	Cr. Wh.	TCPC	860
1	60	Westinghouse	SK-123	1750
1	60	Westinghouse	SK-153	850
2	50	Westinghouse	SK-143	850
1	35	Gen. Electric	DLC-203	700
2	35	Allis Chal.		1300
1	30	Allis Chal.		875
1	30	Westinghouse	SK-123	850

HOISTS

1—Welen—2 drum 8000# per drum, each drum is 6" clr. with 430 ft. of ⅝" cable per drum can be increased to take 600'. 130 FPM per drum, driven by 25 HP., 1750 rpm., 220 V. D.C. Mtr.

HOISTS or WINCHES

200—1½-ton Hand Cranked ratio 37.1 thru an enclosed double reduction gear unit with 4 planetary gears mounted on steel plate complete with 48' of ½" cable, ratchet type brake, push button release.

CAR PULLERS

100—Brand New with ½" cable, 1½ and 2 ton A.C. or D.C. Motors.

SPECIAL BARGAIN

100 KW. Diesel Engine Generator Sets

11—100 kd., 230-275 v. D.C. Delco Generators dir. con. to 150 HP., GBD-8, 3½x7, 8 cyl. Superior Diesel Engines, elec. starting with muffler, power panel and accessories. AL-MOST NEW—ONLY USED AS SPARES.

BRAND NEW TURBO SET

Westinghouse Steam Turbine consisting of 200 kw., 220/440 v., 3 ph. 60 cy. 1200 rpm., 80% P.F. A.C. Generator—40 kw., 120 v. 1200 rpm., D.C. Exciter and Westinghouse Reduction Gear.—Non-condensing. Send for Catalog.

SPECIAL BARGAIN AIR COMPRESSORS

5—240 CFM Westinghouse type 3 VB-23 8 cyl. vert., 150 lbs. pres. dir. con. to 50 HP., 220/440 or 2200 v. 3 ph. 60 cy. West. Gila Ring Motors, auto. Control. Can furnish D.C. Motors or Oil or Gasoline Engines if desired.

DUQUESNE ELECTRIC & MFG. CO., PITTSBURGH (6), PA.

Write for New Stocklist — **Montrose — 5800**

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FOR SALE

20—1½ KVA G-E 120 240 480—120 240 DRY
40—10 KVA A-Ch 450 225—117 234 DRY
10—10 KVA A-Ch 460 230—230 115 DRY
20—15 KVA A-Ch 450 225—117 234 DRY
9—15 KVA A-Ch 460 230—230 115 DRY
15—20 KVA W-H 450 225—117 234 DRY
12—20 KVA W-H 460 230—230 115 DRY
6—25 KVA W-H 450 225—117 234 DRY
6—26 KVA W-H 460 230—230 115 DRY
3—75 KVA W-H 230 460—115 230 DRY
6—25 KVA W-H 13200—120 240
9—37½ KVA W-H 13200—120 240
3—50 KVA Pitts 26400—2300 4000Y
3—50 KVA G-E 33000—2400 4160Y
3—150 KVA G-E 2300 4000Y—115 230
3—200 KVA W-H 6600 11430Y—2300
3—333 KVA G-E 13800—120 240
1—Gas Fired Recirculating Youngs Bros. DRYING OVEN. 2 Compts., complete with controls.

TRANSFORMERS WANTED

Rewind and repair services on all makes of transformers. One year Guarantee.

THE ELECTRIC SERVICE CO.

Cincinnati 27, Ohio

We Specialize in Buying Complete Mines That Are Going Out of Business Or From Receivers in Bankruptcy, Administrators of Estates, Etc.

250-Volt Ball-Bearing Locomotives

3—6-ton General Electric, Type HM-821
3—6-ton General Electric, Type HM-801
2—6-ton Westinghouse, Type 905C
4—6-ton Goodman, Type 33A14T
3—8-ton General Electric, Type HM-819
2—8-ton General Electric, Type HM-807
3—8-ton Goodman, Type 32-84T

The above Locomotives are from 36" to 48" gauge. All are equipped with CY-21 motor-driven gathering reels and 500' of practically new cable. All are rebuilt. Can make immediate shipment.

DC Shortwall Machines

3—112AA Universal Goodman, on tip-turn trucks
2—7-AU Universal Sullivan Machines, late type, 42" gauge
4—12-AA Goodman Standard
4—29L Jeffrey Top Cutters
4—29L Jeffrey Bottom Cutters
5—24L Jeffrey
1—29C Jeffrey Permissible Top Cutter

AC Shortwall Machines

3—Goodman Universal 112CG3A, on self-propelled trucks, reel and cable, 7½' cutter bar
1—35-B Jeffrey
8—11B Sullivan, 12,000-14,000 series

250 Volt DC Loading Machines and Shuttle Cars

2—14-BU Joy Type 14BUPE
3—42E13 Shuttle Cars
4—7-BU Joys
4—11-BU Joys
5—No. 5 Myers Whaley
3—L-400 Jeffreys
2—8H-460 Goodmans

AC Loading Machines

1—8-BU Joy, on cats.
3—7-BU Joy, on cats.
3—12-BU Joy

Conveyors and Belting

7—LaDel FA Flight Room Conveyors, 300' each
4—LaDel FF Flight Face Conveyors, 50' each
467—Intermediate Sections, 26" wide with 2½" diameter idlers
1—LaDel U-17 Shaker Conveyor, 350' long
4—LaDel UN-17 Shaker Conveyors, 300' long
2—Goodman Duckbills
1—24" Homocord Belt—7493' long
1—Model MTB—30" Belt Conveyor, complete
2—Model MTB—26" Belt Conveyors, complete

Miscellaneous

Mail or phone in your inquiries regarding Hoists, Substations, Mine Cars, Tipples and any other hard-to-find equipment.

COAL MINE EQUIPMENT SALES COMPANY

306-307 BEASLEY BUILDING — L. D. PHONE 14 — TERRE HAUTE, INDIANA

FOR SALE

25 ALL STEEL, FOUR POCKET, 70 TON HOPPER CARS equipped with MULTI WEAR STEEL WHEELS. Located near Philadelphia.

CHARLES DREIFUS CO.

12 S. 12th St., Philadelphia 7, Pa.

Caterpillar Tractor, Model 30 PS Series w/ side boom.
Caterpillar Tractor Mod. 20, PL Series w/ end winch.
Auto Car 1943 Model U7144 w/ Enclosed Cab.
Boiler Tubes • Pipe
Gas Engines • Machinery

BRADFORD SUPPLY COMPANY

Wayne, Wood County, Ohio — Near Toledo

FOR SALE

CRUSHERS

1 McNally Pittsburgh 24 x 48 single roll crusher.

HOISTS

1 Wellman Engineering Company, single drum hoist, 16' in diameter, 7' face, 1-5/16" between peaks, 5⅛" flange, 1¼" rope, 870' per minute. Complete with a 400 HP Westinghouse motor, 2,200 volts, 3 phase, 60 cycle, 250 RPM, type HF, and GE automatic control, CR2124 for mine hoist service, 2,200 volts, 400 HP.

1 Ottumwa Iron Works, single rigid cylindro-conical drum hoist, serial #4080, weight 43,000 lbs., 1⅛" rope, complete with remote control and hydraulic brakes direct connected to Western Electric 150 HP motor, model 17815, type MT 564-10-150-720, form B, 3 phase, 60 cycle, 440 volts, slip ring, secondary volts 288, amps. 187, secondary amps. 182, speed full load 700, serial #1563312, continuous 40° C. Complete with controller and resistance.

1 Ottumwa Hoist #3561, drum diameter 18" face 26", face grooved for 1" rope, equipped with post brake 54" diameter, hand operated, single reduction cut spur gears, 19 teeth and 196 teeth, 1¼" pitch, 10" face, drum shaft 7" diameter, drum shaft bearing 7"x10", pinion shaft bearing 4½"x15" of the ring oiling type, direct connected to 100 HP Westinghouse motor, type CW, 220 volts, 3 phase, 60 cycle, 260.8 amps, 580 RPM, #2394851.

LOCOMOTIVES

1 6 ton Jeffrey locomotive, 42" gauge.
1 5 ton Jeffrey locomotive, 42" gauge.
1 4 ton Whitcomb battery locomotive, 36" gauge.

ELECTRIC DRILLS

1 Little Giant AC electric coal drill type 472, 3 phase, 60 cycle, 220 volts, type IPF, serial #145502.
1 Desler Electric drills, AC, 220 volts, new type.
2 Desler Electric DC drills, #472.

MINING MACHINES

1 Goodman Universal Mining Machine, 112AA, DC, 6½' cutter bar.
1 Goodman Universal Mining Machine, 112AA, DC, 6½' cutter bar.
1 Jeffrey Shortwall Mining Machine, 35 BB, AC, 6' cutter bar complete with tip turn, truck, cable and reel.
1 Sullivan Shearing Machine, Class CH11, DC, 9' cutter bar.
2 Sullivan Longwall Mining Machines, type CHS, 3-60-220 volts, 30" cutter bars.

MOTOR GENERATOR SETS

50 KW Westinghouse motor generator set, DC end 250 volts, 200 amps, #14, type S, field serial #621904, commutator #11 IT 135B, 860 RPM, compound wound, AC end, 75 HP Westinghouse induction motor, type CS, 3 phase, 60 cycle, 2,200 volts, 18.1 amps. per terminal, 40° C temp. rise, 870 rpm, #4564186, complete with switchboard for DC end and compensator for AC end.

50 KW General Electric motor generator set, 256004, type BR, form C, I.S. 256070-39, 200 amps, 250 volts, 1740 RPM, cont. 50°C, direct connected to 75 HP General Electric induction motor, type KT552 4 75 1800 Form B, 3 phase 60 cycle, 220 volts, 174 amps, 1,750 rpm, #4323202, cont. 40°C, complete with manual switchboard and compensator.

100 KW Diesel generator set, 250 volts DC complete with switchboard.

COPPER

Several hundred feet used 500,000 CM Weatherproof stranded copper.
Several hundred feet used 500,000 CM Bare stranded copper.
Several thousand feet used 4/0 Figure 8 trolley wire.
Several thousand feet 1,000,000 CM lead covered copper.
1,500 feet 2-0 3 Conductor rubber covered cable, used.

VIBRATORS

1 Tyler "600" vibrating screen, two surface vibrator 5x16, No. 8058.
1 Tyler "600" vibrating screen, No. 8072, size 8x18, single deck, (Could be made double deck).
1 3'x7' Single deck vibrator.
1 3'x6' Simplicity Engineering Co. single deck vibrator, type S.

PIT CARS

29 Sanford Day ball bearing pit cars, overall length 6'-2", width 36", height 21", wheelbase 15", 12" diameter wheels, 3 link couplings, end door dumps, 20" gauge.

TIPPLE

1 Steel tipple complete with shaker and concrete silos. Capacity 1,000 tons per day.

We are distributors for John A. Roebling's Sons Company wire rope and fittings.

GAVENDA BROTHERS, Inc.

CANTON, ILLINOIS

MINING EQUIPMENT

Priced to Sell

MOTOR GENERATOR SET
Westinghouse, 75 KW, 2200 Volt AC 275 Volt DC, 4000-2300 AC.

ROTARY CONVERTERS
General Electric, 50 KW, 2300 AC Primary, 275 DC Volts.

LOCOMOTIVES
Jeffrey, 4 Ton, MH 96, 44" Gauge.

CUTTING MACHINE
12AA Goodman with Truck.

I BEAMS
10 Inch—Heavy Section.

HAND WINCHES
All-Steel, Three Ton Capacity.

COPPER WIRE
500,000 CM Bare and Insulated 4/0 Grooved and Figure 8 Trolley.

G. I. OIL CANS
5 Gallon—hinged lid.

25# RAIL
100 Tons—Excellent Condition.

2000—25# STEEL TIES
44" Gauge—Like new.

TWENTY-FOUR—25# SWITCHES
Complete with Throws.

MINE CARS
3 Ton, 48" Gauge, 29" High.

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Caldwell 200 tons Horiz. Hydraulic Wheel Press.
Niles, B & Pond 200 tons Hydr. Horiz. Wheel Press.
Bradley 200# Helve Hammer (Motorized).
LeBlond 30"x20' Q.C.G. Engine Lathe.
Cincinnati #4 and #5 High Power Horiz. Millers.
Columbia 32" B.G. Hyd. Duty Shaper.

FALK MACHINERY COMPANY
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NARROW GAUGE EQUIPMENT

36" Gauge

1—20 ton Davenport Locomotive, steam-operated, 165# W.P. A.S.M.E. boiler.
3—12 ton Whitcomb Locomotives, gas.
46—4 yd. Koppel Quarry Cars.
14—5 yd. Koppel Dump Cars.

24" Gauge

1—4 ton Plymouth Locomotive, gas.
1—5 ton Whitcomb Locomotive, gas, Type 3-SP.
30—1 cu. yd. all steel Koppel Cars.

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HOSE SALE

BRAND NEW GOODRICH

4" DISCHARGE HOSE

Complete with male and female couplings, 200-lbs. pressure, rubber-lined, in 50-ft. lengths. **Sale Price**

USES: Portable Pipe Lines; Fire Hose, Sewer and Trench Work; Manholes; Discharge on Pumps; Mines.

50-ft. length complete with fittings ..... **$30.00** **60c** per foot

Phone COLLECT—your order will be shipped TODAY

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MOTORS • GENERATORS
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25 cy. 60 cy. D.C.

ALL VOLTAGES 1-1500 H.P.

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BOUGHT and SOLD

ELECTRIC EQUIPMENT CO.

ROCHESTER 1, N.Y.

FOR SALE FROM MINE OPERATOR

1 Reliance Electric and Engineering Co. Motor Generator set, 75 KW capacity. Motor 500 V. DC generator 250 V. DC, mounted on base. Complete unit brand new and never operated.
1 Reliance Electric and Engineering Co. Motor Generator sets, 40 KW capacity. Motor 500 V. DC generator 225 V. DC, both units in good operating condition.

The Davis Coal and Coke Co., Thomas, West Virginia

MOTORS and ELECTRICAL EQUIPMENT

ENGINEERED AND REBUILT BY SPECIALISTS IN OUR MODERN PLANT

SQUIRREL CAGE MOTORS
3-PHASE 60 CYCLE

Qu.	HP.	Make	Type	Volts	R.P.M.
1	30	Whse.	CS	550	900
2	40	Al. Ch.	AB	440	880
1	40	Master	PA-445	440	1200
3	50	Whse.	CS	440	880
1	50	F.M.	B-16-A	440	900
1	50	Al. Ch.	AB-220D	440	1185
1	50	Ideal	AT-445	440	1750
1	60	Whse.	CS-607	440	880
1	75	G.E.	KT-354	440	880
1	75	G.E.	KP-542	440	1760
1	75	WHSE.	CS	440	1750
1	75	Al. Ch.	AB	2200	1765
5	100	F.M.	118-201C	440	880
1	100	WHSE.	CS-706	2200	1170
2	100	G.E.	KT-556	2200	885
2	100	G.E.	K-344	2300	1175
1	100	Al. Ch.	AB	2200	1160
1	100	G.E.	I-R	440	1800
3	100	WHSE.	CS-663	440	1750
2	125	Al. Ch.	AB	440	435
1	125	WHSE.	CS-761	440	1750
1	125	WHSE.	CS-7725	2200	1170
1	150	G.E.	I-R	440	600
1	150	El. Mchy.	B B	440	1200
1	150	WHSE.	CS-7729	2200	1170
1	200	Al Ch.	AB	440	600
1	250	WHSE.	CS	2300	1200

TRANSFORMERS (OIL COOLED)
1 PHASE—60 CYCLE

Qu.	K.V.A.	Make	Voltage
2	10	WHSE.	2400-480/240
2	18	KUHLMAN	480/240
1	25	ALLIS CH.	2300-460/230
1	30	G.E.	2200/1100-608
3*	37.5	WHSE.	460/230-230/115
3	50	ALLIS CH.	22000-220
2	50	WAGNER	13200/11880-575/287
14 (NEW)	100	G.E.	4330/4160-125/250
2	100	G.E.	1900/9500-2200/550
3 (NEW)	150	WAGNER	4000/4400-2300
3	667	G.E.	2300/4000Y-460

—AIR COOLED.

SLIP RING MOTORS—CONSTANT DUTY
3-PHASE 60-CYCLE

Qu.	HP.	Make	Type	Volts	R.P.M.
2	5	Al. Ch.	ARY	440	600
1	7½	G.E.	MT	550	870
1	10	Howell		440	600
1	15	G.E.	MT-332	440	845
1	15	Whse.	HF	440	1150
2	15	G.E.	I-M	220	1125
1	20	G.E.	MT-326	220	850
1	25	G.E.	MT-526	440	850
1	25	G.E.	MT-332	2200	850
1	25	Al. Ch.	ARY	2200	860
2	25	Whse.	CW-4810	220	1750
2	30	Whse.	CW	440	1160
1	40	Al. Ch.	ARY	2200	425
3	40	G.E.	MT-346	550	570
3	60	G.E.	I-M	440	1170
1	50	Al. Ch.	ARY	2200	600
2	50	G.E.	MT-536	2200	1150
1	75	G.E.	I-M	220	695
1	100	Whse.	CW-951C	550	600
1	125	Al. Ch.	ARY	440	900
1	150	G.E.	I-M	440	1190
1	150	G.E.	I-M	2200	1750
1	200	G.E.	I-M	2200	880
1	200	Al. Ch.	ANY	2200	600
1	250	Whse.	CW-1100	2200	580
1	300	Al. Ch.	ANY	2200	885
1	300	G.E.	I-M	2200	1200
1	400	G.E.	I-M	2200	900
1**	450	G.E.	MT	2200	257
1**	600	G.E.	MT-412-Y	2200	710
1**	750	G.E.	MT-414-Y	2200	709
1**	1200	Whse.	CW	2200	590

*40 CYCLE.

**—MILL TYPE 2 PEDESTAL BEARING ON ANY CAST IRON BASE COMPLETE WITH REVERSING PRIMARY AND MAGNETIC SECONDARY CONTROL.

Can supply control, MANUAL or MAGNETIC CONTROL for any of the above motors ENGINEERED to your requirements.

MOTOR GENERATOR SETS
3-PHASE 60 CYCLE

Qu.	KW.	Make	RPM.	Volts D.C.	Volts A.C.
1	5½	G.E.	1800	230	220/440
1	9	G.E.	1800	230	220/440
1	25	Whse.	1200	120/240	220/440
3	50	Whse. (3 Units)	1200	120/240	440/2200
2	35	G.E.	1800	125	220/440
1	50	Le. Al.	1200	120/240	440/2200
1	75	Whse.	1200	125	220/440
1	75	Al Ch.	900	250	2200
1	100	G.E.	1200	250	440/2300
1	100	C.W.	1200	250	440/2200
1	200	G.E.	720	250	440/2200
1	300	G.E.	720	250	440/2200
1	600	G.E.	720	300	2200
2	1000	G.E.	514	600	4150/2300

Above furnished complete with A.C. and D.C. panels and A.C. control.

ROTARY CONVERTERS

2225/2565 K.W. 225/295 V D.C., G.E. 9000 Amp., 450-R.P.M. with booster.
2760—K.V.A. Transf., 6900 V., 3-PH., 60 CY., complete control, and D.C. distribution cubicles.

SYNCHRONOUS MOTORS — ALTERNATORS
3-PHASE 60 CYCLE

Qu.	HP.	Make	P.F.	Volts	RPM.
2	200	Al. Ch.	1.0	2300/440	360
1	30	Whse.	.8	220	1800
3	50	G.E.	.8	2200	600
1	60	G.E.	.8	440	1200
2	100	G.E.	.8	440	600
1	100	Ideal	.8	220	900
1	100	Whse.	1.0	2200	1200
2	100	Whse.	.8	440	1800
1	125	G.E.	.8	2200	900
1	150	G.E.	.8	440	720
1	150	G.E.	1.0	2200	900
1	200	G.E.	.8	440	720
2	200	Al. Ch.	1.0	2300/440	360
1	600	Whse.	.8	440	600

(3)—NEW 1000-K.W. generator or 1250-HP., Syn. Motors. G.E. type A.T.I., 4150/2300-V. 3-PH., 60-CY., 900-R.P.M., dir. con. exciters, pedestal bearing design. Can furnish control equipment and panels.

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All sections of rails and good serviceable second hand cars, all gauges, also spikes, bolts, frogs, switches and ties

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EVERYTHING FOR THE TRACK FROM

SWITCH TO BUMPER

R. R. TIE PLATES
Excellent Relay
100,000 6½" x 9½" for use with 70# to 80# Rails.
50,000 7½" x 10½" for use with 85# to 115# Rails.

MORRISON RAILWAY SUPPLY CORP.

HAND BLDG. BUFFALO 3, N. Y.
EMPIRE BLDG. BIRMINGHAM 3, ALA.

MOTOR GENERATORS

500 KW G.E. SYN. 575 V. 900 RPM. 2300/4000 V. 3 P. 60 C. SWITCHGEAR.

400 KW WEST. SYN. 575 V. 720 RPM. 2300/4000 V. 3 P. 60 C. SWITCHGEAR.

300 KW G.E. SYN. 275 V. 1200 RPM. 440/2300/4600 V. 3 P. 60 C. SWITCHGEAR.

300 KW RDWY. SYN. 275 V. 1200 RPM. 2300/4000 V. 3 P. 60 C. SWITCHGEAR.

200 KW G.E. SYN. 275 V. 900 RPM. 2300/4000 V 3 P. 60 C. SWITCHGEAR.

150 KW G.E. SYN 275 V 1200 RPM. 2300/4000 V. 3 P. 60 C. SWITCHGEAR.

SYNCH. CONVERTER

300 KW G.E. 575 V. Type HCC, 6 P. 60 C. 1200 RPM, Pedestal Type. 2300/4000/6900/13,200 V. Transformers & Switchgr.

LOCOMOTIVES

30-T Jeffrey 250 V.MH-77 Mts. 48"-36" Ga.
20-T Jeffrey 250 V.MH-77 Mts. 48"-36" Ga.
15-T Jeffrey 250 V. MH-77 Mts. 48"-36" Ga.
13-T Jeffrey 250 V.MH-110 Mts. 42"-32" Ga.
10-T Jeffrey 250 V.MH-110 Mts. 42"-32" Ga.
8-T West 250 V. 906-C Mts. 44"-36" Ga.
6-T West. 250 V. 903-B Mts. 32"-22" Ga.

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Converters, Motor Generator Sets, A.C. and D.C. Motors, Control Equipment and Transformers.

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150 HP. 900 RPM. Elec. Mach., 220/3/60 Syn.
125 HP 1800 RPM. West. RK 220 v. D.C.
Stock of 5, 7½, 10 & 15 HP. D.C. Motors.
80 HP. 1200 RPM. Cr. Wh. 220 440/3/60 Ind.
75 HP. 900 RPM. Elec. Mach. 220/3/60 Syn.
75 HP. 1800 RPM. US 220 440 3/60 Syn.
50 HP. 1200 RPM. GE 220/3/60 Slip Ring.
5, 7½, 10 and 15 HP new and used (cfc & open.

SYNCHRONOUS ROTARY CONVERTERS

Qu.	KW	Make	Speed	DCV
6 ph. 60 cycle				
1	500	Whse.	1200	600
2	300	G.E.	1200	600
1	300	Whse.	1200	275
4	175	G.E.	1200	275
3 ph. 60 cycle				
1	175	G.E.	1200	275
1	75	G.E.	1800	275

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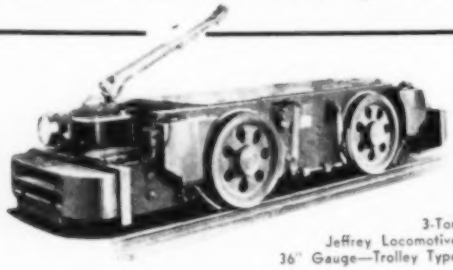
This equipment is *NEW* or nearly new.

***ACT NOW!* Don't wait to modernize your production facilities. This equipment is available *NOW*. It is PRICED right. It IS right. And you get *IMMEDIATE DELIVERY*.**

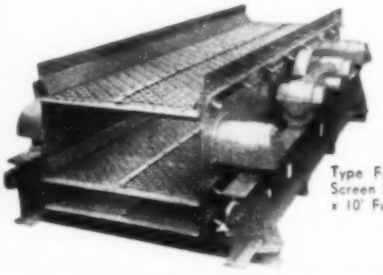


3-Ton
Jeffrey Locomotive
36" Gauge—Trolley Type

20-Ton Goodman Locomotive Trolley Type—36" Gauge

6-Ton Jeffrey Locomotive 36" Gauge—Trolley Type

10-Ton Jeffrey Locomotive
36" Gauge—Trolley Type



Type F-600 Ty-Rock
Screen 2—surface 5'
x 10' Full Floating.

8-Ton General Electric Trolley
Type Locomotive—36" Gauge

THE COLUMBINE MINE EQUIPMENT CO., INC.

FLAT IRON BUILDING, 1669 BROADWAY **DENVER 2, COLORADO**

WRITE FOR OUR COMPLETE LIST OF MACHINERY AND EQUIPMENT

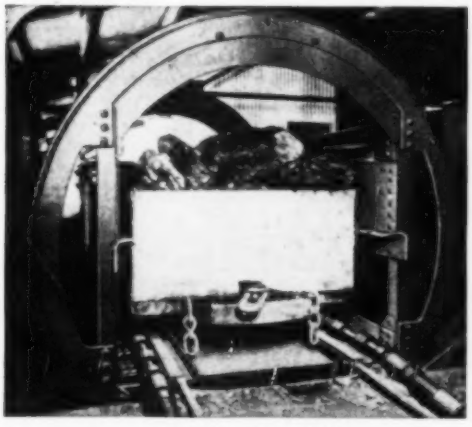
Subsidiary of Portland Equipment Co., 11 Broadway, New York 4, N. Y.

SEE PAGE 199 FOR APPROXIMATE SUMMARY OF HARD-TO-GET OFFERINGS

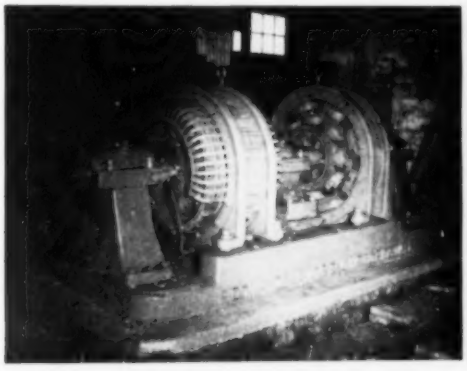
POSSIBLE PRICE INCREASES

This equipment is *NEW* or nearly new. All of our Equipment has been completely over-hauled and Parts replaced with NEW GENUINE FACTORY REPLACEMENTS. Every Item is guaranteed to be as represented, either NEW or nearly new and carries the same guarantee the original manufacturer warrants. We welcome your inspection.

***ACT NOW!* Don't wait to modernize your production facilities. This equipment is available *NOW*. It is PRICED right. It IS right. And you get *IMMEDIATE DELIVERY*.**



ROTARY CAR DUMPER
Fast Dumping of Coal Cars



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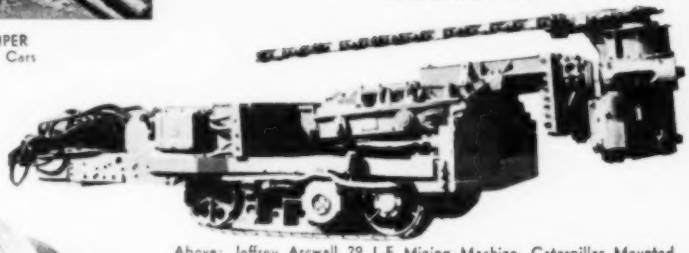
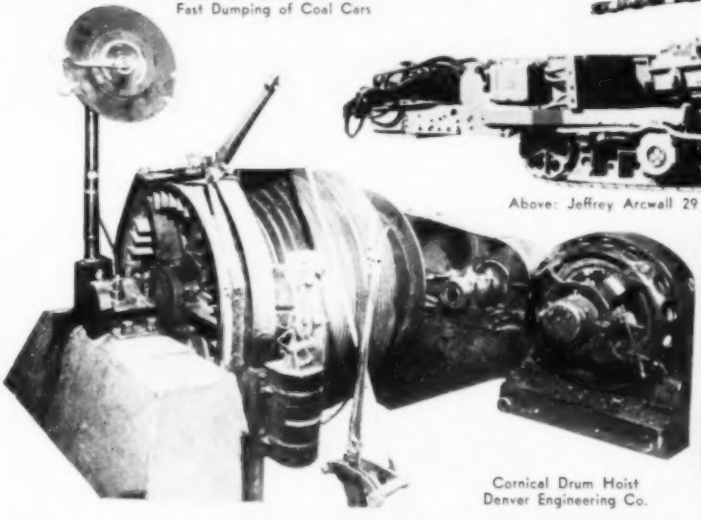
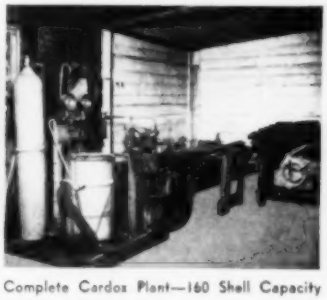


Above: Jeffrey Arcwall 29 L-E Mining Machine. Caterpillar Mounted.



Conical Drum Hoist
Denver Engineering Co.



Complete Cardox Plant—160 Shell Capacity

THE COLUMBINE MINE EQUIPMENT CO., INC.

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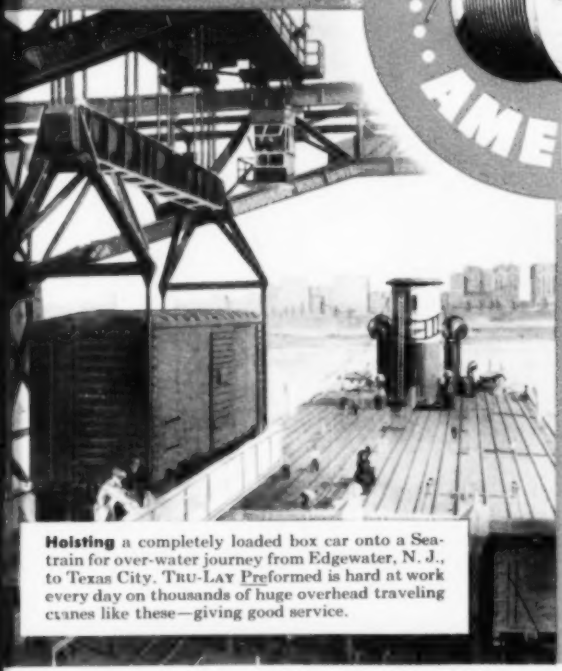
In Galveston Bay, huge rotary drilling rigs bore nine thousand feet under the sea for oil. Long strings of pipe put tremendous shock loads on wire rope. TRU-LAY Preformed stands up extremely well even under such treatment.

Breaking up hard-packed earth is the first step in building a flood control dam in Nebraska. These earth-breaking machines put constant gruelling strains on the wire rope. Here again, TRU-LAY Preformed gives longer, lower cost service.

ALL AROUND AMERICA



Hoisting a completely loaded box car onto a Seatrain for over-water journey from Edgewater, N. J., to Texas City. TRU-LAY Preformed is hard at work every day on thousands of huge overhead traveling cranes like these—giving good service.

Far down below ground in West Virginia's soft coal fields, under-cutting machines claw at the walls of coal. Here wire rope is expendable. TRU-LAY Preformed of correct construction adds many extra hours of service—lowers over-all costs.

ACCO

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AMERICAN CABLE DIVISION
AMERICAN CHAIN & CABLE

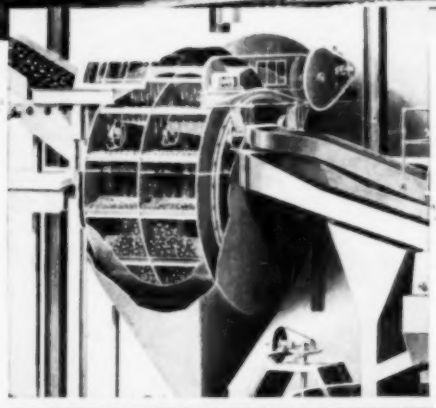
TRADE MARK

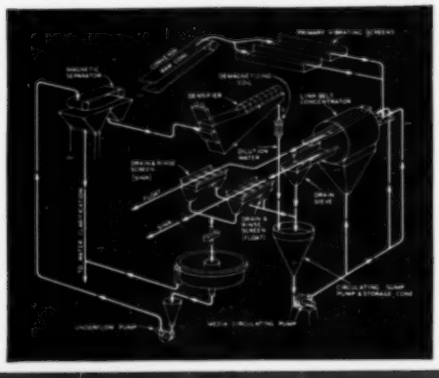
In Business for Your Safety

Tru-Lay *Preformed* **Wire Rope**

"HEAVY-MEDIA" for Anthracite

Another Forward Step in Coal Technology





*The Heavy-Media Separation Processes are licensed by the American Zinc, Lead and Smelting Company. American Cyanamid Company, 30 Rockefeller Plaza, New York 20, N. Y. are the sole Technical and Sales Representatives for these processes.

Link-Belt Float-Sink Concentrator Scores at Mahanoy City

The first preparation plant featuring the "Heavy-Media"* coal cleaning process in the anthracite field has been placed in operation for the Rhoads Contracting Company at Mahanoy City, Pennsylvania.

This process which employs magnetite as a medium has already been widely used in bituminous coal preparation and metal mining. It efficiently removes impurities and produces high grade coal. The Rhoads plant will clean coal from rice sizes up. Hand picking is practically reduced to sizes above 4 ⅜".

The cleaning takes place in a Link-Belt designed and built unit called the "Float-Sink Concentrator", which is shown in the cut away drawing at the left. A flow sheet of the process is also reproduced. For further details call your nearest Link-Belt office or write for Book 2101.

LINK-BELT COMPANY 11.302

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COAL PREPARATION AND HANDLING EQUIPMENT

Engineered, Built and Backed by THE SYMBOL OF QUALITY LB LINK-BELT **LINK-BELT**